# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

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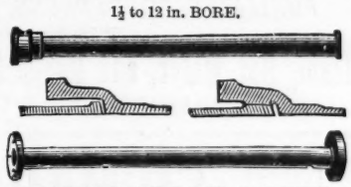

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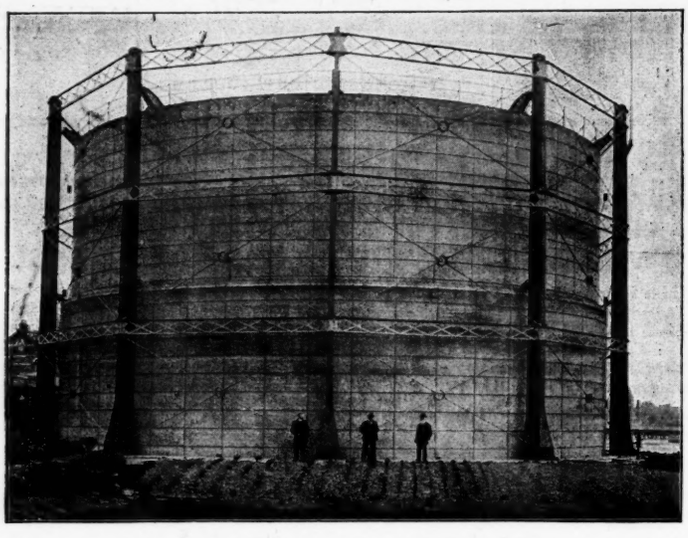

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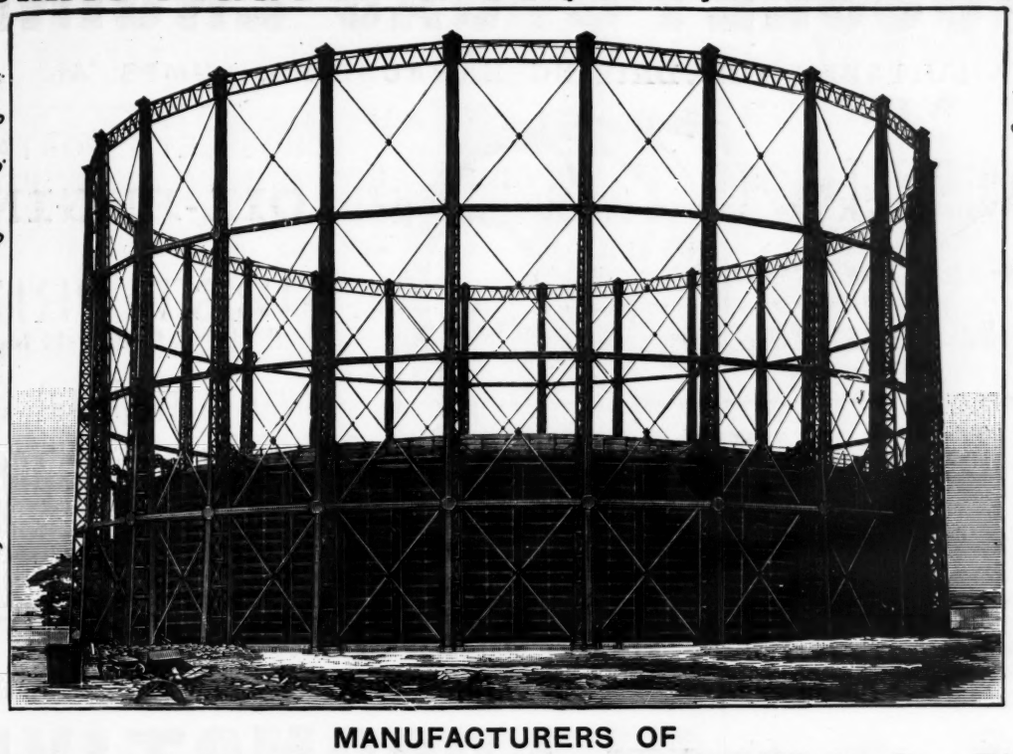

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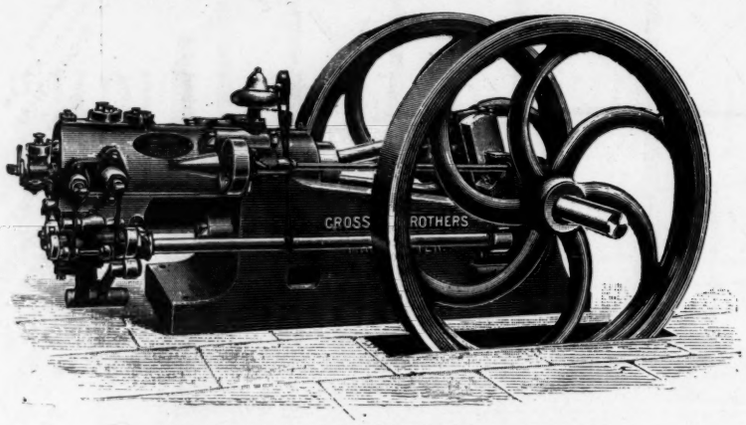


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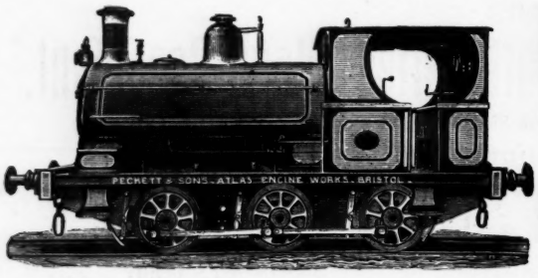


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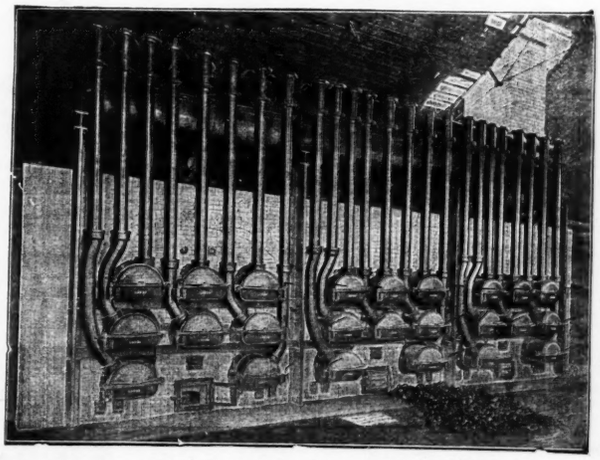

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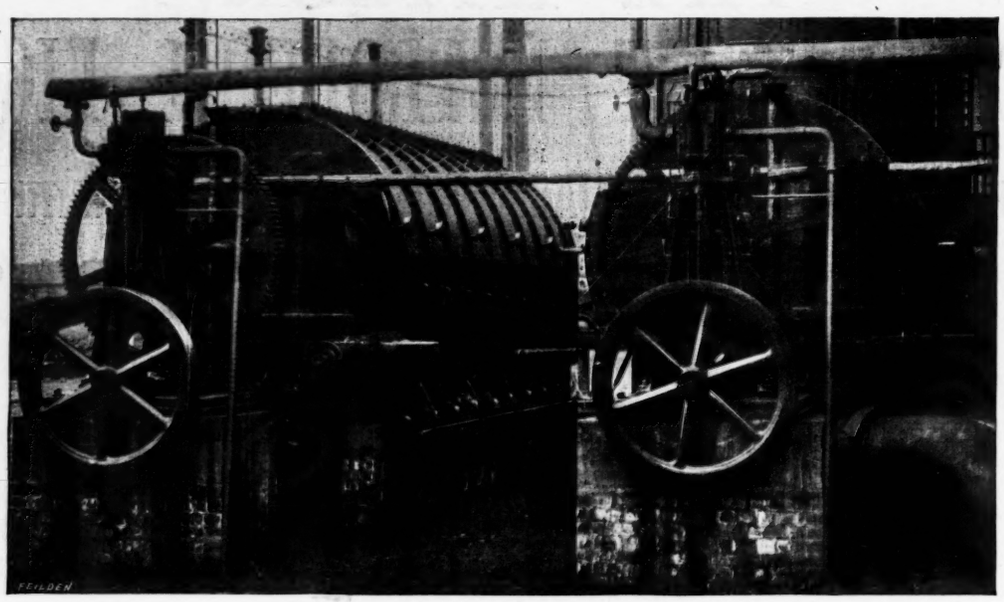

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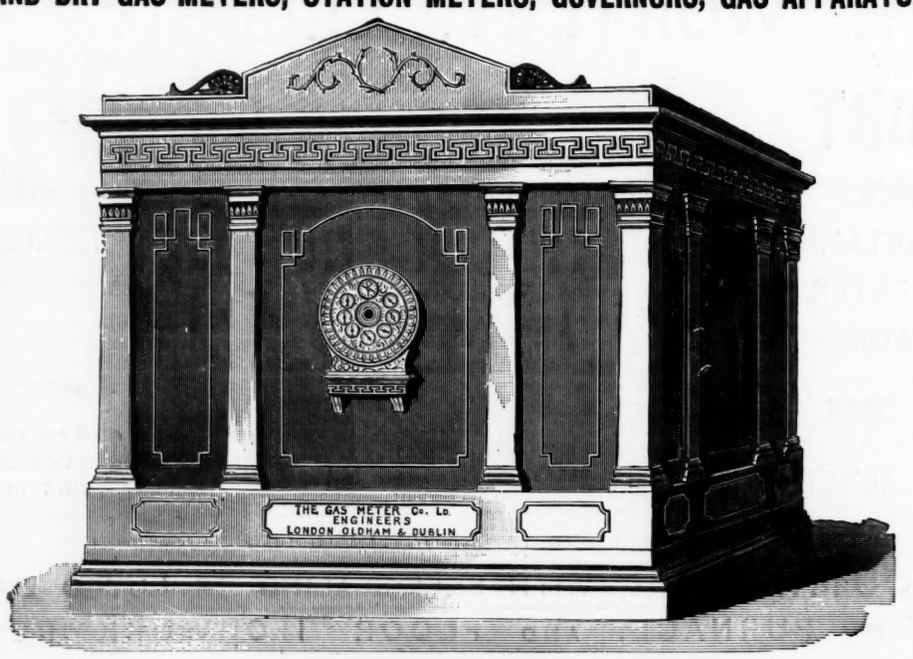


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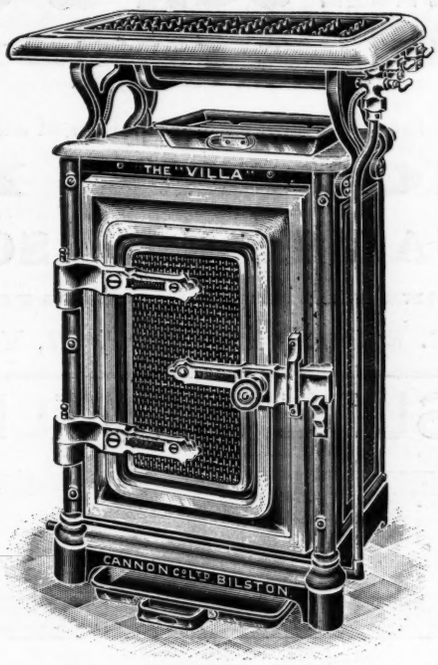


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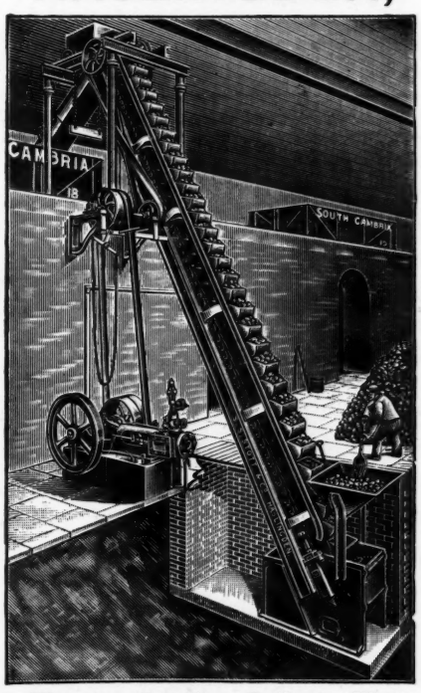


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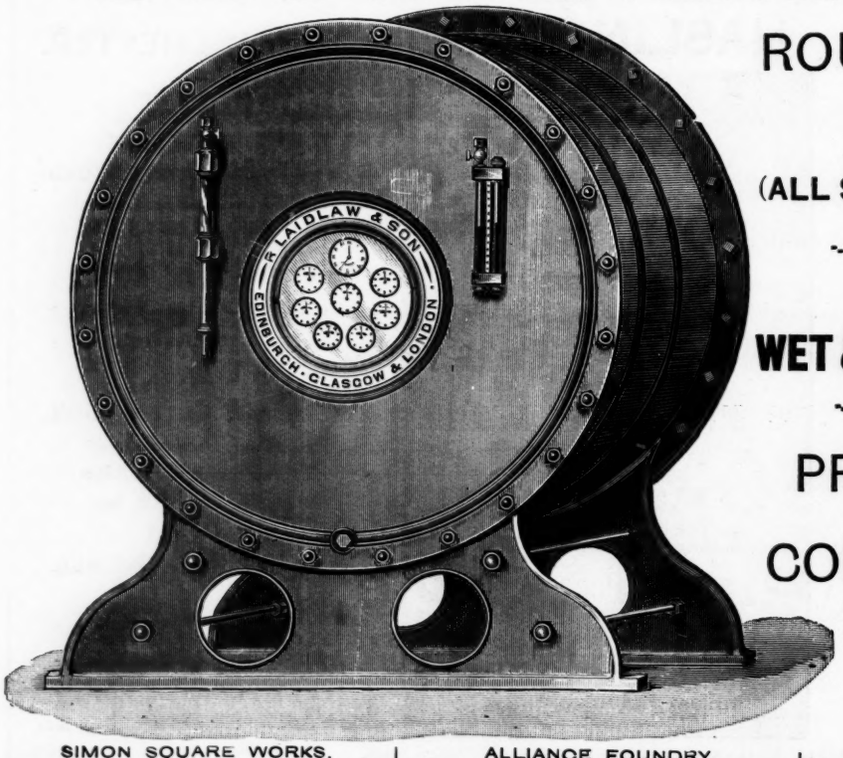


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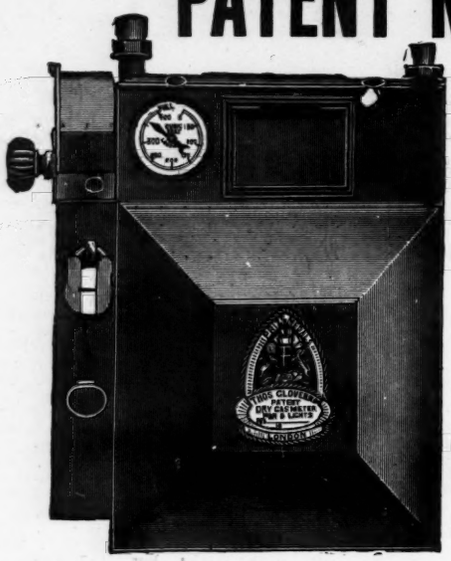

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

VOL. LXXVIII., No. 1993.——TUESDAY, JULY 23, 1901.

# EDITORIAL NOTES.

## Meeting of the Societe Technique du Gaz.

THE account which is given in another column of the proceedings at the annual meeting of the French Gas Society shows that a very successful gathering in all respects has been concluded on the Dieppois shore on the other side of the Channel. A list of twenty-one papers is by no means a bad one for any technical association to get together for a yearly meeting—more particularly when it is remembered that no persuasion is required to bring about this result. The papers are all spontaneously and freely presented; and it would be a satisfactory thing if the same could be said of our own representative institutions. Though a fair variety of subjects has been dealt with, the question of incandescent burners and their photometry, and enrichment by benzol, seem to have been the matters most brought to the front by our French colleagues. In the management of their meetings, it is to be noted that it is the exception, and not the rule, for an author to read, word for word, his contribution. The papers and diagrams all being printed and distributed beforehand, allows of their being thoroughly digested, sooner or later, by all who are interested in the particular subjects. Nothing is, therefore, gained or lost by the mere slavish repetition of printed words. The author only has to draw attention to the principal points raised by him; and thus time is saved, and the proceedings are rendered less formal and more attractive. Then, again, the French papers are often very short, which permits of a greater variety of subjects being treated, and presented for discussion. In these respects, we think that our imitation of the French custom would only redound to our advantage. In congratulating the Société Technique du Gaz on their successful meeting, both in its professional and social aspects, we only desire to add our hearty appreciation of their past hospitality to many English colleagues, and to assure them once again of the great pleasure it gives us to welcome them for an all too brief period to our shores.

## Herr von Oechelhaeuser on Differential Gas Prices.

IT is unnecessary, in writing for those officials and others who are responsible for the security and prosperity of the gas industry, to labour the point of the great importance of the subject of our editorial article of a fortnight ago, upon differential prices for gas in relation to the load-factor of the works. Last week and this, the same thought has been expounded in other columns of the "JOURNAL," in the form of a translated paper by Herr W. von Oechelhaeuser, originally read and discussed at the recent Vienna conference. Our own article owed nothing to this valuable paper, having been prepared without knowledge of its substance; but now that both contributions are public property, it will be useful to tie them together, so to say, by a few observations on their common points. It is also common ground, at the outset, that the whole question of the expediency of charging two distinct prices for one and the same description of gas has been raised anew. This is the salient consideration. Whatever the observations and reflections that have brought about this result in different countries, the fact remains that the old question of differential prices has cropped up again, and more insistent than ever.

Of course, the elements of the new posing of the problem are not the same as the old. This is never the case with what look on the surface like revived controversies. The problem may bear the old name, but it is not expressible in the same formula. It is beyond the power of man to turn back the hands of the great clock that ticks off our thoughts with our lives, and make it show the same face it exhibited of yore. Times change, and we change with them. There is no better proof of the truth of this hoary saying than appears in one's recollections of old polemics. Although most of the greatest problems of life are insoluble, every successive generation sees them in a light of its own, and attacks them in its own way. Then they are laid down for awhile, only to be taken up by fresh hands and given a new twist. We wonder how our predecessors could have attempted to solve their problems in the way they did—so different from our method. Our heirs to these puzzles will think the same.

In another point Herr von Oechelhaeuser agrees with us—that there is no general prescription for the settlement of this question of gas prices. "In no other matter connected "with gas business are local conditions of so great signifi-"cance." This is Herr von Oechelhaeuser. We wrote, independently: "The factors that enter into it are never the "same in two places." The agreement is no accident; for it is not strange for us to be found seeing technicalities eye to eye with either von Oechelhaeuser or Bunte. The coincidence of view is very complete in this instance; and it is a matter on which we greatly felicitate ourselves. Like the practical man of affairs he is, Herr von Oechelhaeuser follows into its commercial relations the question he has to deal with. He marks, as we have done, the bold way in which the dealers in electricity for light and power have cut their prices for the latter. While sellers of gas for power purposes have fancied themselves liberal indeed if they gave a discount of 25 per cent. on the lighting rate to this class of customers, their rivals the electricians make nothing of giving 66⅔ per cent. discount on the same class of accounts. Where this excessive bid for custom has been successful in attracting it, Herr von Oechelhaeuser remarks, the dealers are now repenting of it; because really they cannot afford such terms, and the overlapping of the two demands for current in the winter season is a grave difficulty.

The opportunity of gas undertakings lies in the important economic truth that electric driving for factories, of which so much is heard nowadays, is at least twice as costly, under equal conditions, as gas power. Herr von Oechelhaeuser does not dispute the convenience of electric power, or the saving that its adoption usually effects in the capital cost of entirely new factories. Apart from these considerations, however, it is the fact that the running expenses of a gas-power factory are so much less than those of electric driving that the latter cannot compete on this ground. And when it is borne in mind that a good power trade, where it can be had, is the very ideal addition to a gas company's business, not much more argument should be required to prove how easily, and at what advantage to themselves and benefit to the community, the sellers of gas in such a locality can keep this trade wholly in their own hands.

Herr von Oechelhaeuser's main point is this: The correct way for gas undertakings to face the competition of electricity supplies (for all purposes), and to adjust their policy to the necessities of the present and the future, is to make a big reduction, first, in the price of gas for power and similar daylight all-the-year-round uses. He does not hold with an unintelligent, uniform reduction in the charge for gas for lighting. His reason for this is that the Welsbach system of using gas for lighting has so reduced the cost that the consumer need pay for his light, that any dissatisfied customer in a place where gas is at a reasonable price may very properly be referred to this fact, and advised to get rid of his old burners and procure the best new ones. Light for light, the consumer has had during the past ten years the benefit of a reduction in cost to one-ninth of what he used once to pay. That ought to satisfy him, so Herr von Oechelhaeuser thinks, while the gas companies work out their destinies in other quarters. At any rate, this guiding principle is avowed in Düsseldorf, where the Gas Manager (Herr Grohmann) has taken definitely to the policy of the electricians, and charges 50 per cent. less for gas sold for technical uses, than for lighting gas. It is practically the same at Magdeburg. The logical, practical German mind does not permit any superstitions to stand in the way of the realization of its reasonable conclusions.

Herr von Oechelhaeuser's position was not shaken by the discussion which followed upon the reading of his paper. The utmost that his critics effected was to accentuate his initial point, that the circumstances of every locality must determine its gas policy. Thus the engineer who has to deal with the requirements of a capital city, with a large residential population and much display lighting to cater for, naturally does not see the advantage of differential prices heavily favouring the users of gas power. This is

precisely the line we took a fortnight ago. In manufacturing districts, power and industrial customers are deserving of being served at about one-half the price of lighting gas. It would be foolish to cater in this way for a branch trade where it does not exist. Still, as there are very few places where gas-engines are not used, they should always and everywhere be favoured in the same way. Residential towns especially are concerned in having gas-engines treated with wise liberality, inasmuch as every such motor means a factory chimney the less.

Altogether, therefore, it must be allowed that Herr von Oechelhaeuser's paper, chiming so appositely as it does with the tenour of much gas engineering opinion in this country, demands the most attentive consideration in the councils of gas-works administrators of every description. The chief points taken are so clear, that he must indeed be a stupid gas director or committeeman who should fail to understand them. There is no question here, be it observed, of an essential alteration in the character of gas supplies. The same author has already treated of that matter. The present is another, and a distinct, aspect of the gas business, from its administrative side. The reasoning of the paper applies equally to all qualities of illuminating gas, without distinction. This simplifies the immediate question, while leaving the technical problem untouched. Nothing but confusion could have resulted from any attempt to focus the two matters in the same field. The business of selling gas is different altogether from the art of making it; and it is not every engineer who, like Herr von Oechelhaeuser, is entitled to rank high as an authority on both subjects.

### Some Results of Labour Legislation.

The labour legislation of the more "progressive" of our Australasian colonies is often held up, by the advanced Radicals and Socialists, to this slow-going old country as an example of what might be done here for the "uplifting of the down-"trodden masses," if only labour were properly organized, and took care to return the right men to Parliament. We should first have payment of members and their election expenses, and then the Millennium. A fair day's pay for a fair day's work (the interpretation of the word "fair" to be left to Labour's representatives), employment for everybody, whether a waster or a worker—unless he be that atrocity, a non-unionist. Such would be the elements of the Charter of Liberty, details to be filled in "to taste." What is held up to the British working man as an example, serves also as a warning to those who know that worthy's interests, and what will conduce to his ultimate welfare, more truly than does the type of politician who is so anxious to earn a salary by protecting and forwarding those interests in Parliament. We have more than once called attention to the injustice and industrial evils arising in New Zealand from the operation of the law establishing Compulsory Arbitration Courts. We would now direct notice to some of the results to be observed in New South Wales of the political supremacy of the Labour Party. Our attention has been drawn thereto by an interesting letter published in the "Morning Post" recently from their Special Correspondent with the Duke of York, Mr. E. F. Knight, in which are described the social and political conditions of the colony. In that "land of "universal franchise and paid members of Parliament," we are told, demagogues have great influence; and there is the same inevitable, if unfortunate, tendency as so materially injures the political well-being of the United States—for the better people to keep clear of politics "on account of the gross "personalities and generally disgraceful tactics which charac-"terize the elections."

The result is that the State Parliament is not truly representative of the people of New South Wales; while the Ministers—chosen, as a rule, from the representatives of the Metropolitan constituencies—"are not uncommonly men "who, while perhaps at heart altogether disagreeing from "the Labour Party, fear to irritate it by opposition, and "truckle to it to win the labour vote." To the influence of this Labour Party—which is "excellently organized, and "succeeds in having its own way in most matters"—are ascribed the reckless expenditure in public works to give jobs to the unemployed, and costly socialistic experiments made at the expense of the rural population. Of the latter, Mr. Knight gives an example, eminently characteristic of the sort of thing our own extreme "Progressive" gentlemen are always itching to do. Some four months since, the Minister for Works announced that the minimum daily wage of Government employees would in future be 7s. "Coupled with this was the recognition of the Government's "duty to provide labour for the unemployed in the city at "this high rate of pay"—a pleasant piece of news for the taxpayer. The results can be imagined without difficulty. Every useless loafer considers that he now has a right to receive 7s. a day in return for his idea of a day's work. The Trade Unions promptly laid it down as a rule that "no "one should work for a private employer for less than the "Government minimum wage;" the consequence being most serious trouble, in the country districts particularly, where employers cannot afford to grant such an increase of wages. Many men are therefore leaving regular employment in the country and flocking into the towns—aggravating tenfold the existing difficulty of finding work for the unemployed. This difficulty is still further increased by the fact stated by the Chief Labour Commissioner, that of the unemployed registered on the relief-books in Sydney, "the large propor-"tion refuse to take any country work that is offered them "by the Government at 7s. a day. They are not content to "receive that wage unless their work is within easy reach "of the city dissipations!"

Adequate comment upon such a state of affairs it is difficult to make. Fortunately none is needed. The facts are sufficiently forcible to drive home the obvious lesson. It would, indeed, be a jumping from frying-pan to fire for us to have freed ourselves of the political ascendency of the landed classes, maintained by wholesale direct bribery, merely to substitute the political tyranny of Trade Union puppets, holding office by virtue of even more wholesale, if less direct, corruption. The Member for Sarum must not be succeeded by the Member for The Bricklayer. We already have a few examples of that evil—the members for constituencies containing Government Dockyards and such-like finding it extremely difficult to resist the pressure put upon them to subordinate the general welfare of the nation to the particular interest of their electors. It must not be allowed to spread throughout the body politic, as it undoubtedly would were Members of Parliament the employees as well as elected representatives of their constituents.

That is the main lesson to be learnt from our colony's experience. Another that may be drawn is the folly of attempting to solve economic problems by setting economic laws at defiance. To solve the difficulty of having unemployed men to provide for, the Government undertake to find work for the natural surplus of the city's labour market, and to pay top prices for the product. Result: More unemployed than ever in the city; labour wanted badly, at a reasonable price, in the country. Similarly untoward effects always follow such tampering with the operation of the natural law of supply and demand in the labour market. A municipality gives employment to indifferently able men as road-sweepers at a wage equal to the value of the work done. The labour party in the Corporation insists upon higher wages (probably the minimum wage paid for skilled labour) being given to the road-sweepers, with the result that the older and less efficient man is pushed out of his job by the younger and more able man, who is attracted by the good wages to be earned. Such a two-edged benefit is not appreciated by the unskilled man, who prefers half-a-loaf to no bread.

### Unpopularity of Street Subways with Pipe Owners.

The old proverb which sets out the difference between the leading of a horse to the water and making him drink, was illustrated last week by what transpired at the meeting of the London County Council in respect to the provision and use of street subways for gas and water pipes and electric wires. The subject was mentioned in the report made by the Highways Committee, with reference to the receipt of a statutory notice from the New River Company of their intention to proceed with the laying of a 30-inch main in the roadway of the Victoria Embankment, from Blackfriars to Northumberland Avenue. There is a subway, of a kind, underneath one of the sidewalks of the Embankment; but the Highways Committee had the mortification of being compelled to admit that it could not accommodate the proposed main. Consequently "there appeared to be no alter-"native but to allow the Company to place the main direct "in the carriageway." This was a stupid, as well as a graceless, way of putting the matter upon the minutes; for it does not behove the Executive of a local authority to talk of what "appears" to be or not to be. They have to deal with facts, not visions. The Committee, however, were obviously annoyed over this business, chiefly because the proceeding of the Company was strictly legal, and because the facts of the

case were calculated to throw discredit on the vaunted street subway idea. It came out, in the course of the short but embittered discussion on the minute, that the Committee experience the greatest difficulty in getting the Post Office and the Companies to use the subways where they already exist. The subject is engaging the attention of the Committee; and it is to be hoped that the majority of the members of this body do not share the pugnacious disposition displayed by a few other ornaments of the County Council, who are clamouring for an Act of Parliament to compel parties to use the Council's subways. That is the true way of the cocksure Progressive, who may scarcely know a subway from a steamboat, but is perfectly confident of the competence of the County Council to provide both, and manage them with the help of a Compulsory Act.

It would be far more to the advantage of the public and the ratepayers whom the County Council exists, in theory, to protect, if the Highways Committee would take friendly counsel with the people who fight shy of the subways, and ask them the reason for this line of conduct. Members of the Council talk about the existence of popular discontent with the way in which the streets are taken up for the purpose of laying mains and wires; but, if it comes to that, the public are just as dissatisfied with the way in which every piece of street engineering is done by the Council themselves. If the Council go to Parliament for compulsory powers to make the Post Office and the Gas and Water Companies put their properties in subways against their will, Parliament will hear what these parties have to say for themselves. It will be cheaper for the Council to listen to this tale first, and not go prancing about Westminster under the spurring of this or that "Johnny Head-in-Air," which seems to be an amusement of growing attraction for the present Council. The steady, frugal-minded members of the Council could not do a more useful service to the people of London, so indifferent to the vagaries of their rate-spenders, than collect together, for publication, the records and the actual and prospective costs of the parliamentary doings and aspirations of their more reckless colleagues.

### The Strike of American Steel Workers.

THE strike of the Trade Unionist steel workers of the United States has begun, and, as usual, the widest discrepancy exists between the statements as to its extent and rate of progress emanating from the respective sides. While the Trade Union leaders aver that some 60,000 men are out, the employers cannot find more than a fraction of the number missing from their accustomed jobs. Already, in other respects, the strike has missed fire. The organizers calculated upon the artificial combination of employers' interests known as the Steel Trust being unable to resist a sudden blow at the heart. They expected that the heads of the Trust would consent to anything just now rather than commit themselves to an industrial conflict. But, as has happened at other times and in connection with other affairs, these would-be terrorizers of the Anglo-Saxon discovered too late that men of this breed are bad to frighten. There have been many strikes for "principle;" and not one has ever succeeded in even the most qualified way. In the present case, the employers who have been struck against "for the recognition of the Union," have simply closed their ranks, and engaged other men in the places of those who committed themselves to this insensate proceeding. There is sure to be a great deal of loss of time and money, and it is quite possible there may be bloodshed before the business is over; but, if so, it will not be all on one side.

It is very remarkable that some of the general public, who are not employers of labour, and some writers in newspapers, never understand this kind of strike. Already, it is reported, certain American newspapers are indulging in the customary wail for "arbitration," and publishing what are intended to be harrowing pictures of starving workers and bloated capitalists. The latter will not carry conviction to the average American's mind, for there is no secret about the fact of the American iron and steel worker being about the highest-paid man of his class in the world. Besides, the strikers on this occasion have gone into the affair boasting of their resources. It is, however, quite possible that, in view of the suffering which every strike inflicts upon those who are not concerned with the issue, a handful of amiable outsiders will endeavour to try "conciliation" in respect of this outbreak. We in England have experienced the same futility. What this class of people completely fail to appreciate is the truth that when men strive for sovereignty, not for shekels, there can be no compromise. The struggle must go on to the finish. It is a good omen that the leader of the strikers in this instance, who bears the un-English name of Schaffer, has already found it expedient to shift his ground. Discovering that the American public did not sympathize with the original reason assigned for the strike—to make the Union supreme in all the shops controlled by the Steel Trust—this person promptly denied that there was any basis for so foul an insinuation of motive. What the strikers wanted was an assurance that the works of the Trust would not be closed against their Union! But inasmuch as there was no evidence forthcoming that any such embargo rested upon the Union, or was likely to be imposed, the excuse is a little too transparent. That prohibition of the Union, of course, is quite likely to be the effect of the strike. It will be the old story over again. The Trade Union officials would not leave well alone, and suffered from "swelled head." There is only one cure for this distressing complaint.

### An Ironmonger's Grievance.

REALLY, if some people are morbidly sensitive on the score of municipal trading, having regard to the principle of the thing, others are absurdly "particularist" in their preference for the retail shopkeeper. Recently, in the "Iron-"monger," we discovered a paragraph entitled "More "Municipal Trading." Upon investigation, this turned out to be a tirade against the Tunbridge Wells Gas Company, for venturing upon the hazardous speculation of maintaining incandescent gas-burners in the town at an inclusive charge of 9d. per lamp per quarter. How this can be "municipal "trading" passes our comprehension. The writer evidently does not like the idea, which seems to be strange to him. He supposes the Company have some reliable data to go upon in making their offer; but he is doubtful about it. Anyhow, he imagines that the ironmongers of Tunbridge Wells will be content to let the Gas Company carry out their experiment without protest. Certainly, he does not see how any private firm could do the work at the price. This is at once the point, and the justification of the Gas Company's action, which ought to be followed by every gas company and municipal gas department in the kingdom. Our friend the "Ironmonger" may rest satisfied that the work can be very well done at the price named. There will, of course, be no profit attached to it at the figure; and some years there may even be a small deficit. But the chief object of a gas company is to sell gas and make the consumers satisfied; and this is the only way to do it at the present day. Incandescent mantles are not fit for domestic servants' handling; and they never will be. Inasmuch as this kind of gas lighting is the only variety that will beat the electric light out of the field, it is natural that those gas companies which suffer most from the competition of electricity will be first to make use of the sole expedient for really popularizing incandescent gas lights. It is only sluggishness that stops the way of the others. The "Iron-"monger" actually styles the action of the Tunbridge Wells Gas Company, which it allows to be outside the powers of retail shopkeepers, a "grievance." Where the ground for complaint lies, it would puzzle our contemporary to state. Nobody must touch a branch of trade that an ironmonger can handle without being called in question for it at some Trade Protection meeting; and now, it seems, the jealousy extends to matters which ironmongers could not possibly have anything to do with! These shopkeepers are more than a little arbitrary in their ideas.

### Gas Manufacture in Slavery Days.

A CURIOUS record of a bygone state of gas making affairs in the United States has come to hand from New Orleans. It is concerned with the practice of the New Orleans Gas Company in employing slave labour, from the inauguration of the undertaking in 1835 up to the tempestuous times of 1862, when the Federal Commander, General Butler, seized the town, and liberated all slaves within the limits of his jurisdiction. The Company had to write off $51,650 on this account; being the then value of 62 slaves owned by them. It appears that, though there had always been a few slaves employed about the old New Orleans Gas-Works, it was not until 1848 that the President of the Company, struck with the apparent economy of slave over white labour, directed the Engineer to purchase from time to time such slaves as might answer the purposes of the undertaking. Somehow, the bare recital of this order strikes one as something repulsive; but it was only very ordinary business for

the time and place. The slaves were entered among the Company's assets at their cost price, which was, in 1855, about $1200 for an able-bodied man in the prime of life. They were revalued every year, and either written down or up as they had fallen off or increased in value to their owners—like horses, in short. The Company bred slaves as well as purchased them. They bought a man and his wife in 1836, when they began business, for $2800; and in 1863, although the old couple were only valued at $400, the offspring numbered six, who were valued altogether at $2900. It is pleasant to find that, although on the city being occupied by the Federal forces a number of slaves ran away from the Company, a larger number, including the family just mentioned, remained by their old owners until emancipated by law at the conclusion of the war. They cannot, therefore, have murmured at their lot.

The books of the Company at the same period show some other curiosities of the age and the local conditions. Some Confederate money in hand had to be written off. The Company did not lose by all their financial transactions during the war time. One odd thing that fell to them to do was the financing of the town theatre, which was done on the security of a mortgage. The rate of interest they covenanted for was so high that, though the principal was never completely cleared off, the Company received more than their money back. The President of the Company, when the Federals entered the City, was also the head of the Merchants' Bank; and he, with the other bankers, was responsible for despatching all the specie in their charge to the nearest Confederate post, at Camp Moore. The first thing the new Commandant did was to confiscate all the valuables he could lay hands upon. Having inquired as to the whereabouts of the gold, he called a meeting of the bankers, and ordered them to procure the return of the specie to the banks. The bankers politely coincided with the General's views, and passed a resolution authorizing the President of the Gas Company to go and get the money back. He went, but never returned. As a pronounced Confederate, he had no intention of putting money in the way of the Federal General; and so he stayed on at the camp, and kept watch over the securities until he died, a year later. At the end of hostilities, the banks all got their own again, which might not have happened if the cash had come back prematurely.

# WATER AFFAIRS.

## The Dry Weather and Water Supply.

THE period of very hot weather, with absence of rain, through which we have lately been passing, has necessarily seriously affected the supply of water in some parts of the country, though, fortunately, the Metropolis has, so far, not suffered any inconvenience. An attempt was made a few weeks ago to get up a scare, by hinting at what the condition of the Thames will be in September if tropical weather continues. True, the river was drawn upon during the past month to a much greater extent than it was during June last year; the average daily draft having been 129,049,904 gallons, compared with 117,929,528 gallons in the corresponding month of 1900. But there were 21,812 additional services to provide for; and the supply was in the ratio of 257 gallons to a service, or, on the usual basis of seven persons to a service, 36·7 gallons per head. Undoubtedly, our stores are being heavily taxed; and the fact that they are available is evidence of the far-sightedness of those who designed the works, and of the recognition of their duty to the public by those who, in the face of much opposition, secured the necessary parliamentary sanction to carry them out. That there is no slackening of the efforts to keep pace with the requirements of the people is shown by the few particulars which appear elsewhere of the progress which has been made with the new reservoirs in course of construction by the East London Water-Works Company, and by the satisfactory account we have lately given of the Staines scheme, which even the "Daily Chronicle" acknowledges will be a "stand-by in time of drought." The statement that it will provide London with an additional 35 million gallons of water daily for a period of three months is regarded by our contemporary as "very refreshing information for house-"holders" in a hot and rainless season. It is doubtless pleasant to contemplate such an addition to our supply; but it will be more so to know that this large store of water is actually in existence, as it doubtless will be in the course of not a great many months. The early completion of these works, and those of the East London Company above alluded to, should relieve London of all fear of having to suffer the inconvenience of a short supply of water.

Turning to the Provinces, the drought has caused a considerable amount of uneasiness among those who are responsible for the supply of water in the large towns. In Liverpool, a few days ago, hints were thrown out of the possibility of a second line of pipe being required from Vyrnwy. Manchester already has one in progress from Thirlmere; and none too soon. Last Wednesday, the consumption of water reached the highest total ever recorded—41¼ million gallons. It was reported to the Water Committee that there is a net available supply, including that from Thirlmere, of 2300 million gallons, which, used at the rate of 35 million gallons daily, would last for 49 days. The Committee ordered the supply to be shut off between 8 p.m. and 5 a.m. as from last Sunday, and the watering of the roads and streets to be discontinued till further notice. They have called upon the public to decrease the consumption of water in every way, by limiting the use of garden hose and discontinuing the washing of windows and swilling of flags; and they have enjoined them not to cause waste by making undue and unnecessary provision for possible requirements during the night. Manchester has been short of water on previous occasions; but no such stringent notice as that above alluded to has been issued since 1893, when, during a period of protracted drought, the supply was curtailed for 66 days. At that time the average daily consumption was only 24 million gallons, and Thirlmere did not exist as a source of supply. Going farther back, 1887 was a memorable year for Manchester; the water in the reservoirs at Longdendale being drawn very low. Three years previously, the state of things was even worse; but the most remarkable year, as far as the effect of drought upon those reservoirs is concerned, was 1868. The additional supply from Thirlmere for which arrangements have been made is greatly needed; for, of the 10 million gallons now taken, only 8 millions can be reckoned upon for use in the city—the remainder having to be deducted for leakages. During the present emergency, it is intended to use only about 3 million gallons of the Thirlmere water, so as to relieve Longdendale, and to store the remainder in the Prestwich reservoir. Meanwhile the Local Authorities dependent upon Manchester are being asked to co-operate with the Corporation in conserving the supply. The curtailment decided upon will apply equally to Salford and Stockport.

Leeds and Bradford are taking steps to ensure a judicious use of the water they have in store; and Alderman Cooke, the Chairman of the Water Committee of the Corporation of the former city has issued a preliminary warning. That it is not uncalled for is shown by the following figures: The quantity of water usually consumed on a week-day is about 17½ million gallons. Last Wednesday, however, an extra 2 million gallons were drawn from the mains. On a Sunday, when, of course, the industrial establishments do not require water, the normal supply is 13½ million gallons; but last Sunday week this quantity was exceeded by 3 million gallons. This additional consumption on a rest-day points to a more than usually lavish use of water for gardens, which generally receive some extra attention on Sundays. However, there is enough water in store to serve the city for about seven weeks, which is more than was available this time last year; so that there is no cause for over-anxiety. Nevertheless, the watering of streets in the higher districts of supply, to which the water has to be pumped, has been stopped. Bradford is not quite so well off as Leeds, for the present store of water there is 110 million gallons less than it was twelve months ago. It is sufficient, however, for eight or nine weeks' supply, if judiciously used. Huddersfield is feeling the effect of the long-continued dry weather. Last week the store of water was only 479 million gallons, whereas it was 562 millions this time last year. The Ashton Joint Water-Works Committee had last week 447 million gallons of water in store—equal to 13½ weeks' supply—compared with close upon 380 million gallons a year ago; but the Chairman (Alderman Wilson) pointed out, at the meeting on Thursday, that since the 10th of May the stock of water had gone down from 686 million gallons to the present quantity, as given above; a lowering to the extent of 18 feet having taken place in half that number of days. It was determined that no water suitable for drinking purposes should be put upon the streets. At Horwich, which lies at the foot of the

hills and moors supplying Bolton, water cannot be turned on for more than a few hours daily. Even in Scotland, the effects of the dry weather have been felt, as will be seen from our correspondent's "Notes" to-day.

The cause of the shortage of the water supply in some parts of the country is, of course, the low rainfall of the year. According to a record kept at Huddersfield, it has been only 10·50 inches, compared with an average of 16·25 inches. During the present month, the fall has been 0·033 inch, against an average of 3·4 inches. Last month, at Oxford, the rainfall, according to the latest report of Sir William Crookes and Professor Dewar, was 1·52 inches, of which half fell on the 30th. As the average fall for June during the past 35 years has been 2·10 inches, there is a deficiency of 0·58 inch, which brings the total deficit for the year to 2·30 inches, or 21·2 per cent. In June last year, taking the whole of the British Islands, the rainfall was 0·70 inch more, and in July 1·30 inch less than the normal. We are evidently in a cycle of dry years.

**Congress of Heating and Ventilating Engineers at Mannheim.**—The third general meeting of heating and ventilating engineers has been arranged to take place at Mannheim from the 11th to the 15th prox., under the auspices of the Union of German Central-Heating Engineers. Technical communications have been promised by Professor Rietschel, of Grunewald, near Berlin, Professor Junkers, of Aix-la-Chapelle, Herr Bolze, of Mannheim, Herr Recknagel, of Munich, Herren Vetter, Haller, and Marz, of Berlin, and Professor Meter and Herr Kelling, of Vienna.

**German Acetylene Association.**—The third annual general meeting of this Association will be held from the 1st to the 4th prox. at Eisenach, under the presidency of Dr. Dieffenbach, of Darmstadt. After the delivery of the presidential address, the reading of the annual report, and the discussion of some recommendations of Committees of the Association, the following papers will be read: "The Construction of Acetylene Apparatus," by Herr J. Knappich, of Augsburg; "The Erection and Working of Central Acetylene Stations," by Professor J. H. Vogel, of Berlin; "The Incandescent Acetylene Light, and Carburetting by Means of Acetylene," by Dr. N. Caro, of Berlin; "The Preparation of Tables for Calculating the Yield of Gas from Calcium Carbide," by Dr. O. Fröhlich, of Charlottenburg; and "The Use of Compressed or Dissolved Acetylene for House and Railway Lighting," by Herr Sylvan, of Göteborg. An excursion and various festivities have been planned in connection with the meeting.

**North Pembrokeshire Water and Gas Company.**—In another part of the "JOURNAL" will be found a notification by the Directors of the North Pembrokeshire Water and Gas Company (an undertaking incorporated by Acts of Parliament passed in the sessions of 1899 and 1900 respectively) of their intention to proceed with the water and gas works they have been authorized to construct at Goodwick, Fishguard, and other places, for which they are seeking the necessary capital by the issue at par of 30,000 shares of £1 each; being three-fourths of the total amount sanctioned. The Company's area, as will be seen by the abridged prospectus, is an important one, including as it does the terminus of the Great Western Railway's new short express route to the South of Ireland. The shares rank for dividend up to 10 per cent.; and a minimum of 4½ per cent. is guaranteed for two years, pending the completion of the works. No preference capital can be created; and the debenture capital is limited to £12,000. It may be pointed out that the Directors are all connected with established gas and water undertakings.

**The Power-Gas Corporation, Limited.**—In another part of the "JOURNAL" will be found the prospectus of the above-named Company, which has been formed with a capital of £350,000, in £250,000 ordinary and £100,000 deferred shares of £1 each, to develop in the United Kingdom the patented processes and inventions for the production of Mond gas, and to carry on the manufacture and sale of the plant and apparatus. The Company will acquire from Dr. Ludwig Mond, the United Alkali Company, Limited, and Mr. E. J. Duff, eighteen patents and applications for patents, and the entire issued share capital of Messrs. Ashmore, Benson, Pease, and Co., Limited, of Stockton-on-Tees. The patents and applications referred to have been reported upon by Professor Threlfall, F.R.S. The consideration to be paid to the vendors for the various properties will be satisfied by the allotment of 66,462 ordinary, and 100,000 deferred shares; no part of the purchase-money being payable in cash. These shares will be distributed in the proportions set forth. There are now offered for subscription 183,538 of the ordinary shares; 60,000 of this class of shares having already been applied for, and will be allotted on the terms of the prospectus. The two classes of shares are entitled to a dividend at the rate of 6 per cent. per annum and each class will further participate to the extent of a moiety of the residue. Sir Henry H. Fowler, M.P., is Chairman of the Company; and among the Directors are Dr. Mond, Mr. G. T. Beilby, Mr. R. Seymour Benson, Mr. E. J. Duff, Mr. E. Lloyd Pease, and Mr. Emile Schweich, F.C.S. The subscription list will close on or before Thursday next; and the minimum on which the Directors will proceed to allotment is 75,000 ordinary shares, exclusive of the 66,462 allotted as to the vendors.

# ESSAYS AND REVIEWS.

## COMPETITION WITH THE WELSBACH COMPANY.

### The Martini Mantle in England.

THE Advisory Committee whose appointment was an understood sequence of the passing of the report at the recent meeting of the shareholders of the Welsbach Company have before them a stupendous task, which must take in (in addition to an analysis of the administrative organization) a consideration of the history and present position of the Company, and all points which affect the stability of its foundation. They will no doubt gravely deliberate on, as being a matter of prime importance, the question of the relation of the capital to the business done, more especially as the business now requires the expenditure of further money for capital purposes. We regard this as a subject in which we have some concern, as bearing upon the price at which the Company can afford to sell their mantles. The late Managing-Director and Mr. Julius Moeller (and who knows more about the incandescent mantle industry than the latter?) both admit the necessity of even lower prices than the present for the purpose of making the future of the Company firm and sure. And lower they must come if the Company wish to effectually turn aside the competition which they to-day, even with the certified but uncontested patent of 1893 at their backs, appear powerless to suppress. We also hope the Advisory Committee will inquire why some long-pending actions over the 1893 patent (a decision in any one of which would either go a long way towards exterminating this competition or would the tighter implant the roots) are still uncontested. The delay merely strengthens the belief of the small shopkeeper who vends such articles as incandescent mantles, that the Welsbach Company shrink from riding full tilt against those who openly deny the validity of the patent in question and who supply the mantles that are alleged by the Company to be infringements. And these shopkeepers continue in that belief even after the day the writ is served on them for dealing in mantles other than the "Auer," and even after the day on which they "plank down" the seven guineas—perhaps less in some cases—in full discharge of the Company's claims upon them for costs incurred. So long as this sort of things goes on—so long as the Company maintain their sedentary attitude against the chief of their competitors, and there is no satisfactory settlement, so long will the belief grow, and the Company will be commensurately damaged. We write thus because visits in the Provinces of late have clearly shown that the fibres of this already deeply-rooted conviction are propagating in an astonishing manner. There is no desire on our part to harass the Company at the present juncture; but this really appears a most appropriate time, while the Advisory Committee are at the elbows of the Directors, for them to look closely into this attack on the validity of the 1893 patent, and to hurry forward a case which (if possible) will set that patent well above suspicion. Upon the result of such an action would depend in great measure the methods to be adopted in setting the Company's house in order. Let it be remembered by both the Directors and the Committee, that eight-and-a-half years of the life of the patent have already passed.

In previous articles, we have called attention to mantles the vendors of which have not denied that, if the 1893 patent is valid, then their wares are infringements; but they dispute the soundness of the Company's claims. During recent travels, we were introduced to a new mantle in Manchester, which it is proposed shall make its appearance under the distinguishing and significant title of the "Leader." There is a distinctive claim for this mantle, which sets it in a category separate from others which we have previously noticed. It is that the substances used in its composition are "entirely different" from those used in the Welsbach and other patents, and that the patent for the "Leader" mantle does not in the remotest degree collide with the claims of any other patent. Now we are not going to set ourselves up as judges of whether there is good and substantial ground for this claim; but, as the claim is made, we cannot ignore it. Time will prove its truth. Meanwhile, the information given to us by Mr. J. K. Lawton and Mr. C. P. Ehmann, of Manchester (who are interested in the promotion of a Syndicate or Company to acquire the patent rights in the mantle and a new burner), will enable readers who are interested in their statements to make further research for the purpose of forming a conclusion on their own account.

The mantle is the invention of Herr A. Martini, of Berlin; and its number is 26,202, of Nov. 10, 1897. The first thing that strikes one on looking at this date is that, if the patent can successfully substantiate its claim to an independent existence, it is rather surprising that it has been so long in making its appearance in this country. But in answer to this point, it is explained that Herr Martini, while a chemist of some note, is not a man of means; and therefore in 1897 he disposed of his patent rights to certain gentlemen in Germany, who immediately started manufacturing the mantle in that country. Success we are told was their immediate portion. The manufacture of the mantle was commenced in 1898; and, although there were only about three months of the lighting season left that year, some half-a-million mantles were sold. So rapidly have the sales increased, that the makers

have recently been compelled to transfer the manufacture to new and larger premises. With such prosperity attending their venture, the owners of the patents, we are informed, had little time to look after the disposal of their English patent. It is pointed out as a rather significant circumstance that, though the mantles were being made for nearly two years while the original Welsbach patent was in force, no attempt was made by anyone to stop their manufacture.

Assuming the statement is true that there is nothing in the ingredients of the mantle which in any way infringes the Welsbach patent of 1893, then the same free and progressive trade in them that has been realized in Germany may be expected in this country. Among the components mentioned at the time of the inspection of the mantle in Manchester were thorium nitrate, sodium, or potassium, and a small percentage of the salts of tin. Then the information was volunteered that there is a fractional addition of something which the makers keep as a "secret." We do not like "secret" processes in these days in connection with such a delicate matter as the composition of mantles; and that single statement would repress (if we desired to judge) any expression of opinion as to whether or not the mantle infringes the 1893 patent. A fractional overlapping would be sufficient to damn the mantle, assuming the validity of the 1893 patent. But in fairness it must be said that an assurance was given that there is nothing in the "secret" process which has any identity with the patent in question; and, in fact, the makers declare that they do not, and never will, use any of the Welsbach mixtures. A further part of the process, which is described as remarkable, is that at a certain stage diluted sulphuric acid is added, which tends to make the mantle more durable and pliable; and this in any other composition, it is said, would cause precipitation.

On the point as to the independence of the mantle, the opinion of Mr. E. T. Whitelow, Assoc.M.Inst.C.E., of the International Patent Office, Deansgate, Manchester, was handed to us. He says: "In my opinion Patent No. 124 of 1893 (Imray) is simply a patent for the admixture with thorium, of certain defined proportions of three definitely named rare metals—viz., uranium, cerium, and prazeodymium in a solution for soaking mantles. Patent No. 26,202 of 1897 (Martini) is a patent for a process of construction or preparing mantles; and, in my opinion, the invention described is perfectly good subject-matter for a patent (assuming the novelty as to which I have made no search in view of your statement that he obtained a German patent, which circumstance is alone *primâ facie* evidence of novelty), and is properly described and claimed. Provided the rare earths described by Imray are not added to the thorium (or, if they are added, it is in proportions substantially different from those claimed by him), then I consider there is no infringement of Imray's patent by a mantle made according to Martini's process. In a word, I look upon the two patents as being independent of each other; and in a technical sense as being for quite different inventions, both having the same object." Readers who are interested in making their own comparisons of the specifications will find the principal portions of the Welsbach 1893 one in the "JOURNAL" for March 13, 1894, and of Martini's in the issue for Oct. 25, 1898. Cerium is mentioned in one or two of the modifications of the latter; but there is the statement of the promoters of the proposed Syndicate that the substances actually used are "entirely different from those claimed in the Welsbach and other patents."

The next point is as to the efficiency of the Martini mantle. It is credited with a remarkably high illuminating power, which looks almost too good to be true. Once more we fall back on a report for confirmation of the statement that the duty of the mantle is equal to 60-candle power, with a consumption of 3·33 cubic feet of gas per hour, at a pressure of only 9-10ths of an inch. The tests were carried out by Messrs. Davis Bros., of the Manchester Technical Laboratory; and in their report (dated June 10) they say: "We have photometrically tested the incandescent mantle you left with us yesterday. The gas pressure was equal to 9-10ths of an inch of water; and the rate of consumption was 3·33 cubic feet per hour. The mantle after burning ¼ hour, tested 54·4-candle power, and at the end of ½ hour 58·9-candle power." This is a result as good as anything the Welsbach Company can secure with their ordinary mantles and burners; and if the mantle tested was a sample of the mantles turned out in the ordinary run of manufacture, and if the patent can be upheld, then its success is assured. In order to further convince us, it was stated that a gas engineer (whose name was privately mentioned) has tested the mantle on a common burner, and finds the efficiency is equal to 17 candles per cubic foot of gas per hour. We have ourselves had one of the mantles under observation during the past week; and our experience so far is that the mantle has maintained an excellent brilliance and shape.

Speaking of the shape, it may be incidentally mentioned that the mantle, instead of being in the form of a cone, is of the same circumference throughout its length, with just a slightly rounded top; and this gives a little advantage in the way of increased incandescent area with the same depth of mantle. With lengthened service, there is said to be no apparent shrinkage; and their durability is another characteristic for which claim is made. It is not intended to manufacture the mantle in this country; but, notwithstanding, it is proposed to sell them wholesale at a price which will enable the retail dealers to dispose of them at a figure certainly 25 per cent. below the Welsbach price, assuming again that they are allowed to do so unmolested, or after the independence of the patent is verified. The mantle may now be left until the next step is taken to give it a commercial status in this country. Coming as it does to us with pretensions to novelty, its fate will be watched with more than ordinary interest.

In connection with this mantle, a new burner will be introduced—the invention of Mr. Ehmann. But the application for the patent having only been made this year (No. 9171), we cannot yet describe it. The burner has been devised for working at low pressures. Its principle is a baffling arrangement, whereby the rise of the mixture of gas and air is retarded, to ensure complete admixture before reaching the point of combustion. To some extent hot air is also introduced. The results gained by the use of this burner are claimed to be an increased illuminating power from the mantle, and a reduced consumption of gas. We have not yet seen the burner, nor subjected it to any test.

## ECONOMISTS ON MUNICIPAL TRADING.

IN the "Economic Journal" for June are two contributions to the never-ending discussion on the subject of municipal trading—one entitled "Municipal Industries and the Ratepayer," by that eminent writer on Economics, Professor William Smart; the other a memorandum by Mr. J. Row-Fogo of some figures which he intended to add to his article on "The Statistics of Municipal Trading," which appeared in the March number of the "Economic Journal," and was fully reviewed in our issue for June 4. The principal object of that article, it may be remembered, was to point out that the Parliamentary Paper which served Sir Henry Fowler as the basis for his Presidential Address to the Royal Statistical Society, gives a false impression regarding the "net profits" earned by industrial undertakings owned by municipalities. The paper dealt with gas-works only, they forming by far the most profitable department of municipal trading; the "profits" and "losses" of all the other undertakings balancing with peculiar exactness.

The average "profit" for five years, on gas undertakings, was shown in the Parliamentary Paper as £370,340—a figure proved by Mr. Row-Fogo to be in excess of the real profit, using the word in its ordinary commercial sense. "This profit," says Sir Henry Fowler, "in the majority of cases, is applied in the reduction of rates." Sir Henry's statement has led many people (who have ignored his qualification) to believe that the whole of the sum mentioned—£370,340—goes in relief of rates; but at the cost of considerable labour, Mr. Row-Fogo analyzed the official returns for the five years, and showed that the sums paid in relief of local taxation amounted to no more than about £270,000.

The point which he is now concerned to make is that it is a mistake to imagine that this sum of £270,000 is spread over all, or even the majority of, the municipal gas-works in this country; the truth being that the profits of municipal trading are chiefly contributed by a few prosperous corporations—"the average local authority lagging far behind." In order to obtain a fair view of the rate-relieving capacity of municipal industries, as exemplified in its most profitable branch—the management of gas undertakings—Mr. Row-Fogo has analyzed the Board of Trade returns for 1897-8 relating to all the local authorities supplying gas; and he shows that of the sum of £315,000 paid in relief of rates that year by the 167 gas-works, one-third was contributed by the two Corporations of Manchester and Birmingham, one-third by seven others, and the remaining third by 57 authorities. No less than 101 works contributed nothing to the rates. As Mr. Row-Fogo says, "this examination shows that even the most profitable branch of municipal trading cannot, in the country as a whole, be regarded as a means of appreciably reducing rates. The generalizations which have been made from the total profits earned have been too superficial." This view of the question receives further confirmation when it is borne in mind that, of the amount that is applied to the relief of rates, some portion is derived in the first instance from those rates, through the failure to include in the cost of gas making all its share of management expenses, rent, &c.

Professor William Smart's article is intended to show to what extent the ratepayers who are not customers of a municipality's trading enterprises are interested in those undertakings. His examination of the question is mainly on theoretical lines. Some practical factors—such as the labour difficulty—are not taken into account, while to others sufficient importance is not attached; but his arguments, which would be strengthened were those factors fully allowed for, are not such as will be very pleasing to the enthusiastic municipal trader. We say "arguments," rather than conclusions, because the latter seem to fall somewhat short of the former. For the purposes of his examination, Professor Smart divides municipal undertakings into three classes. "It is," he says, "obviously one thing (A) for a municipality to start milk-shops and coal-depôts, where we can buy our milk and coals or not buy them, as we wish. It is another thing (B) for a municipality to monopolize the telephones, so that if we want a telephone we must pay the municipality's price. It is a third thing (C) for a municipality to start public libraries, which we are not to pay for as and when we use them, but to pay whether we use them or not, and, moreover, to pay according to ability"—that is, according to rateable value.

As to A and B, he says, "the chief criticism is, not that they involve the use of money for purposes that are more or less sectional, but that it is doubtful how far a committee can manage

a business as well as private enterprise, and that the time and energies of our public men are apt to be diverted from fields where their services are more obviously wanted." Such are certainly forceful objections against the idea that municipalities can do everything for the community more efficiently and economically than private traders. But there are other equally cogent arguments to be urged against that idea, which, it is true, Professor Smart sets out in the course of his article, though he does not appear to realize how often they could with truth be urged successfully against specific enterprises. He says, for instance: "The people who pay are the people who buy the milk . . . both interest and sinking fund coming out of the price of the milk. The only thing that may be urged is that, in case of failure, it would not be possible to add to the price of municipal milk so long as it was of the same quality as, and competed with, the milk sold by ordinary dealers. In this case, capital would be called up from us all in the shape of a levy. There is, besides, the danger that both the loss and the levy might be disguised by questionable book-keeping, conscious or unconscious, and the industry carried on. *Further than this*, the citizens are not interested as subscribers and ratepayers." The italics are ours; the last sentence reminding us of the bulletin which said that John Smith had fallen downstairs and broken his neck, but, fortunately, had sustained no further injuries. A town council take up electric lighting in order to display the "go-ahead" energy of the members, and make it a great success (on paper) by "questionable book-keeping;" a very real loss being borne by the ratepayers—gas consumers, oil users, and electric light users alike. "Further than this," the ratepayers "are not interested." For most of them, this would probably seem far enough.

Then Professor Smart comments upon another argument in which "there is some force," but not, in his opinion, so much as is usually credited to it. That is, that a municipality can afford to undersell private traders because, as a municipality, they can borrow their capital more cheaply—using therefore the credit of the private trader *quâ* ratepayer to injure him *quâ* trader—compelling him, in fact, "to provide a stick to break his own head." Upon this, Professor Smart remarks: "It is true, as regards men with small capitals; it is more doubtful as regards those whose security is ample. And to this extent, it is equally an argument against people with large capitals going into . . . trade at all. It is open to the suspicion of being a plea for small dealers and high prices." This sounds convincing; but it is not. Municipalities can raise capital more cheaply than any combination of private traders, especially when the latter have no statutory monopoly; and, even were it otherwise, the combination of private traders could not do what the municipality would be doing—pledge the small dealer's credit for the purpose of ruining him.

Another fallacious argument to which Professor Smart commits himself is that any undertaking "which involves control of the streets" should be taken over by the Municipality, "seeing that anything which tears up the streets affects those who use the streets, and affects the trade of the shops which line the streets. The streets, in fact, are property for whose making and maintenance we pay rates; and if, after this, the streets are allowed to be abused for private profit, we ratepayers have very good reason to complain. For the municipality to take over such a business, seems to me a natural extension of recognized functions." The absurdity of this argument is obvious when we call to mind the number of industries which may be said to "abuse the streets for private benefit." The brewer's dray, the coal merchant's waggon, the carrier's van, cause as much obstruction to the foot passenger or the private vehicle as does the opening up of the paving to connect a gas-service; and they far more frequently occur. Would it be "a natural extension of recognized functions" for the municipality to take over the brewing, coal vending, and carrying trade? Gas and water companies are allowed to disturb the streets and occupy the ratepayers' property, subject to their fulfilling certain conditions. So are the omnibus companies; in both cases for private profit. If the disturbance be a good reason for municipalizing gas and water, it might just as well be pleaded as an argument in favour of the local authority taking over omnibuses.

In regard to class C—undertakings in the nature of public libraries—Professor Smart, curiously enough, appears more concerned for the ratepayer than in regard to enterprises of a more distinctly trading character. Perhaps we should rather have said "naturally enough," seeing that theoretical considerations appeal with so much greater force to the professorial mind than do practical. The practical objections to the indiscriminate municipalization of industries, such as those of supplying milk or coal, appear to us far more weighty than do the theoretical objections to free libraries or free ferries as forms of public enterprise.

That class of undertaking is condemned by Professor Smart on grounds that apply with equal force to the maintenance of roads and bridges out of the rates—namely, that the ratepayer contributes, not in proportion to his usage of the facilities provided, but in proportion to the value of the property he occupies. The case for the public maintenance of free libraries, free elementary schools, and so forth, is, of course, that the whole community benefits more or less directly by the provision of opportunities of self-improvement and education for those who would otherwise not obtain them. Free ferries seem so exactly equivalent to free bridges, that to argue against the one is to argue in favour of the re-imposition of toll-gates on the other; and surely no one is desirous of again instituting those public nuisances. In all such cases, the preponderance of benefit—in convenience and expedition—to the community over the trivial monetary injustice to the non-using ratepayer, is so great that argument is needless.

It is a pity that the Professor devoted so much space to matters which are of so very slight importance to the ratepayer, compared with what is involved in his being saddled with an ever-growing number of trading undertakings, that had better in most cases be left to private enterprise. He would have done greater service had he more definitely adhered to, and emphasized, his remark, with which we may conclude, that "Some convincing reason must, of course, be given for the municipality taking up another industry at all. There is always the preliminary question whether the time and strength of its members are not already taxed to the utmost by the functions at present performed; and, after that, the question why the municipality should take on their shoulders a business risk which private employers are willing to take on theirs." There is little to add to this. It is the position always taken in the "JOURNAL"—that every case must be decided on it own merits, with due regard to certain general principles.

## THE COAL AND IRON TRADES IN THE JUNE HALF YEAR.

AT this time last year, when we reviewed the events in the coal and iron markets during the first half of 1900, the state of the markets was very different from what it is to-day; and the past six months presents in retrospect a striking contrast to the history of the corresponding six months of last year. It is true that by July last the iron and steel trades had begun to show, to the close observer, signs of having passed high-water mark; but no obvious symptoms of reaction from the extraordinary activity of the preceding two years had presented themselves; while the "boom" in the coal trade, so far from showing signs of abatement, was as pronounced as ever. Top prices were reached, in fact, by almost all qualities of coal in the second half of last year—thanks, mainly, to the advice given to the always ignorant public by the usually ignorant writers in the halfpenny papers. We carefully preserve and cherish an article that appeared twelve months ago, in a contemporary that is often described as "enterprising" (an adjective that covers a multitude of sins), in which the reader was adjured to forget the heat he was then enduring, and to think of the cold, cheerless days of winter that would surely come, and go straightway and buy his coal—as much as he could possibly store in cellar and in garden—against the time when it would be unobtainable at 50s. a ton. The readers of our "enterprising" contemporary took that advice by the thousand—and the coalowner chuckled. But, even with that assistance, coal did not reach 50s. a ton.

At the present time, no one—not even the most "enterprising" among us—talks about "coal famines," "the fulfilment of Jevons's prophecies," and so forth. Instead, the coal merchants vie with one another in the multitude of their advertisements of "lowest summer prices"—things unheard of twelve months since. The past six months have, in fact, witnessed the declension of coal prices, not to the lowest level, but practically to the figures from which they rose so rapidly in the winter of 1899-1900; and buyers have been able to negotiate their contracts at figures by no means unsatisfactory, considering the difficulties (in regard especially to wages) that lie in the way of a rapid downfall of coal prices. The extent of the downfall since last year can be readily seen from the following quotations, taken from the "Colliery Guardian."

| Description of Coal | Price per Ton. July 1, 1900. | Jan. 1, 1901. | July 1, 1901. |
|---|---|---|---|
| Best Northumbrian steam, f.o.b. Tyne. | 17s. 6d. | .. 13s. 9d. | .. 13s. 0d. |
| ,, ,, smalls ,, . | 12 9 | .. 7 0 | .. 5 0 |
| ,, Durham gas ,, ,, . | 17 0 | .. 12 3 | .. 10 0 |
| Barnsley thick-seam house, at pit . . | 15 0 | .. 14 3 | .. 11 6 |
| Best Cardiff steam, f.o.b. Cardiff . . | 24 3 | .. 20 3 | .. 19 3 |
| Coke. | | | |
| Best Durham foundry, f.o.b. Teesside . | 30 0 | .. 17 6 | .. 15 3 |

Quotations do not, of course, always (if they ever) indicate the lowest price at which a big consumer can buy. But for purposes of comparison they serve well; and the foregoing figures show how completely the face of the fuel market has changed in the space of twelve months. Those who last autumn declared the change to be inevitable, have been fully justified by the event.

The altered position of affairs has been brought about, partly by an increase in output, but mainly by a falling off in demand, both at home and abroad. To take the foreign trade first, the complete export returns for the half year just ended show a decrease of 1,093,159 tons as compared with that period in 1900; and the total is actually 20,583 tons less than that for the first half of 1899. The shipment of "bunkers"—not strictly exports—shows a considerable increase, due in some measure to their exemption from duty. The total figures for the half year are—

| | June Half Year. 1899. Tons. | 1900. Tons. | 1901. Tons. |
|---|---|---|---|
| Coal exported for sale . . . | 20,990,630 | .. 22,063,206 | .. 20,970,047 |
| Shipments of bunker coal . . | 5,959,552 | .. 5,782,485 | .. 6,424,699 |
| Total shipments . . . | 26,950,182 | .. 27,845,691 | .. 27,394,746 |

The probabilities are strongly in favour of the exports of fuel

during the second half of the year showing a still larger decrease over that period of 1900. Trade on the Continent—especially in Germany and Russia—is in a very depressed state, and displays at present no symptoms of revival.

So far as the home market for coal is concerned, the greatest falling-off in demand has been witnessed in respect to the iron and steel trades. In other industries, the demand has tended to decrease rather than increase. Gas companies in many instances are buying slightly smaller quantities this year, owing to their having made up their stocks again, and to the check put upon gas consumption by high prices; but the dominating factor in the situation has been the great reaction in the iron market.

Throughout the half year, the number of pig-iron furnaces at work in this country has been about 25 per cent. less than twelve months ago; while the import and export returns speak plainly of the diminished volume of orders executed. Those returns may be summarized as follows:—

| | Exports, June Half Year. 1900. Tons. | 1901. Tons. | Imports, June Half Year. 1900. Tons. | 1901. Tons. |
|---|---|---|---|---|
| Pig iron | 819,442 | 447,486 | 51,324 | 62,010 |
| Unwrought steel | 184,448 | 104,657 | 29,991 | 64,329 |
| Other descriptions of iron and steel | 989,083 | 898,107 | 35,012 | 42,160 |
| Total | 1,992,973 | 1,450,250 | 116,327 | 168,499 |

These figures show that our manufacturers sold 542,723 tons of iron and steel to foreign customers less this year than last, and lost to foreign manufacturers orders for 52,172 tons more than they missed in the first half of 1900. To this must, of course, be added the decrease in the volume of orders due to the slackness of trade at home, consequent on the killing effect of the high prices in 1900. How these prices have tumbled down, can best be shown by the following comparison of the quotations given weekly in the "Iron and Coal Trades Review:"

| | Prices per Ton. July 5, 1900. | Jan. 3, 1901. | July 4, 1901. |
|---|---|---|---|
| Pig iron— | | | |
| No. 3 Foundry, Middlesbrough | 69s. 0d. | 50s. 0d. | 44s. 3d. |
| Scotch warrants | 67 0 | 57 5 | 51 11 |
| ,, hematite | 83 0 | 65 2 | 57 0 |
| Welsh ,, | 90 0 | 80 0 | 57 6 |
| Manufactured iron— | | | |
| Marked bars | 230 0 | 190 0 | 170 0 |
| Common bars | 215 0 | 160 0 | 140 0 |
| Steel—Ship-plates, Glasgow | 167 6 | 135 0 | 115 0 |

It will be seen that in every description, so far from there having been any recovery from the fall that had taken place by the end of last year, a further, and, in most cases, a very considerable, reduction has been witnessed during the six months just ended. In that period the stocks of iron in the public stores have increased from 157,193 to 190,904 tons; while the total stocks held in this country are estimated at something over 500,000 tons. These are, comparatively speaking, small figures; and in some quarters there is a disposition to look upon this fact as having a material bearing upon the situation. But, considering the large margin of productive capacity existing at the present time—the make of iron could be increased 25 per cent. at short notice, and would be if the demand justified it—we do not think that great importance need be attached to the absence of large stocks.

The position in the iron and steel trades is perhaps somewhat less gloomy than it was three months ago; but that is the best that can be said of it. The reduction in prices has had the effect of stimulating activity in the shipbuilding trade in a somewhat unexpected fashion; and the war still gives considerable employment to some branches of the metal trades. But, speaking generally there is no depth in the market. Buyers will not commit themselves beyond their immediate and pressing requirements, and wisely so. There is no prospect of prices rising materially, there is room for, and possibility of, their going lower; while the course of events in America is difficult to forecast, and may have a decided influence in the direction of depressing prices here still further. At present, trade is so very active in the States that we and our Continental neighbours are not receiving so much attention from the American manufacturers as we may when things are quieter on their side. No reason, therefore, exists for users of iron or steel work to buy far ahead; and they certainly at present show no inclination so to do.

During the half year, no labour disputes of serious magnitude or duration have interfered with either the iron or coal trades; the threat of the miners to strike *en masse* against the imposition of the coal tax coming to nothing, after creating a considerable stir. Wages have been generally on the decline; the Federated and the South Wales coal miners being the exceptions to the rule. The following are the percentages above the standard rates of wages now being paid in the various districts, compared with those in force at the end of the past two years:—

| District. | Percentages of Wages above Standards. Dec. 31, 1899. | Dec. 31, 1900. | July 12, 1901. |
|---|---|---|---|
| Northumberland | 25 | 61¼ | 38¾ |
| Durham | 33¾ | 65 | 52½ |
| Federated districts | 40 | 50 | 60 |
| South Wales | 30 | 73¾ | 76¼ |
| Fife and Clackmannan | 53¾ | 97½ | 60 |
| West of Scotland | 56¼ | 100 | 62½ |

The fall in wages has been severe in Scotland, where trade depression was first felt and still noticeably exists. The miners there and in the Federation districts are the most likely to cause trouble in the near future. Mr. Pickard and his henchmen will not, we may be sure, say good-bye to the maximum 60 per cent. until they are positively forced to do so. Whether that will be by the logic of events or by some more painful process, remains to be seen. Iron and steel workers in all districts have suffered considerable reductions in wages under their sliding-scales.

To briefly sum up the history of the six months, they have shown a marked and persistent improvement—from the buyer's point of view; smooth water has been reached again after a very rough passage; and no cause for anxiety exists in regard to the future, speaking, of course, in a necessarily limited sense.

## ELECTRIC LIGHTING MEMORANDA.

**The Question of Electric Traction and the Suburban Railways—Cause of the Popularity of Electric Lines—The Situation and the Remedy—A Serious Nuisance.**

THERE can be no question of the gravity of the situation into which the progress of electric tramways is bringing one suburban railway after another. Actually, English railway companies are just beginning to experience in their own persons something like what the gas industry felt fifteen years ago, with the difference that there does not seem to be any break in the gloomy prospects lying before the railway interest. All railways, whether steam or electric, depend for their existence upon the efficient and profitable performance of the same service—the carriage of passengers; and where there is any advantageous difference, it is on the side of the newcomers. We mentioned last week the opening of a large addition to the West London electric tramways. It will be some time, however, before everybody concerned realizes what an enormous difference this undertaking makes in the transportation facilities of this part of the world. Londoners are going about telling one another that it is possible to get from the Bank to Kew Gardens in less than an hour, by tube and tram, for the sum of 4d. This distance is about twelve miles. The journey can be made at three-minute intervals all day and more than half the night long; and the standard of accommodation observed in the cars is distinctly higher than that to which any railway company have risen.

To compare such a service with that of any suburban railway is to place the latter in a second place. The chief superiority of the electric tram and tube route, from the passengers' point of view, is that they take him to the very spot he wants to reach, and without requiring him to wait for the train. The ordinary railway station is seldom or never just at the place where the passenger wants to go. Consequently, he has to go to it. In the region covered by the London United Tramways, the railways that will feel the competition most are the London and South Western, and the District. Of these, the former brings all its London passengers to its wretchedly-situated terminus of Waterloo, which is in Lambeth. Nobody ever wants Lambeth. Consequently the average railway passenger by this line has another journey to make after the railway has turned him into the mean and shabby streets amid which it ends. The new "tube" electric railways can be entered from the very centre of the business or the pleasure life of London. Their stations are like an ordinary shop. Even so small a point of convenience as this weighs with the constantly-travelling public.

Then, there is the enormous consideration of the frequency of the service. The long, infrequent train to which the exigencies of the working of steam railways has hitherto condemned the suburban passenger—thus treating him exactly like a long distance, main-line traveller—is not convenient. It is usually unpleasantly crowded at busy times, and its unpunctuality is proverbial. Trains at half-hourly intervals during the morning and evening, and once an hour at other times, represent very fairly the usual suburban passenger service. There are several stations in West Middlesex where the solitude is not broken by a train even once an hour. Consequently, people almost forget the existence of the line. Contrast this with a service of 3 minute cars, running along the main road, at about one-half the cost, and the preference of the public for the newer system ceases to need further explanation. The District Railway, it will be remembered, is on the way to be converted to electric traction. Those who have experience of it in its existing state will think it high time that some radical change was made in the character of the service. Then will come the turn of the North London, the South London, and the Brighton lines. It is a serious prospect for the railway companies, although the electrical engineering firms are rejoicing greatly. An enormous amount of capital will have to be spent in this way during the ensuing ten years, much of it without any prospect of increasing business, but simply to retain old custom. There are drawbacks, of course, to the electric trams and tubes, from which the existing railways are free. This will be to their advantage, so far as it goes.

Residents along the routes traversed by the overhead trolley line trams have their own particular grievances, of course, which will not stand in the way of the extension of the system wherever it has a fair chance of being commercially successful. The objection to the disfigurement of the thoroughfares by the standards and wires remains; but it does not prevail. People who feel it strongly must close their perceptive faculty to it, and think more of the convenience. A graver nuisance, in the estimation of dwellers in or near the electric trams, is the terrible

noise and not insignificant rumbling and trembling which the running at a considerable speed entails. This really is a serious matter. It is no joke to have the eldritch scream of the trolley in one's ears from 5 o'clock in the morning until 1 o'clock the next morning; and if this goes on, there will be trouble. It is a question whether the German "bow" arrangement for taking off the current from the live wire makes on the whole less noise than the trolley; but whichever proves to be the more silent system will undoubtedly prevail. It is not a pleasant fact to remember that the whole of this West London tramway equipment is American. Perhaps the nuisance complained of passes unnoticed in America; but it must be borne in mind that statutory permission to carry on an undertaking in the United Kingdom does not convey the right to commit a nuisance.

## DEBATE IN THE HOUSE OF COMMONS ON THE HOUSING QUESTION.

THOSE readers of the "JOURNAL" who are interested in the subject of the housing of the poor of towns, and who may be in general agreement with our way of looking at the various questions involved in this matter, will probably expect us to say something about the discussion started by Dr. Macnamara in the House of Commons last Tuesday. The occasion was the vote in supply for the Local Government Board; and this member requested that the Board might be more active and zealous, and might also treat local authorities more generously and sympathetically, particularly in regard to the repayment of loans in respect of housing schemes. He repeated some of the painful stories about over-crowding which are unhappily so plentiful in contemporaneous literature, and fell back upon the ineptitude of speculating as to whether the Local Government Board could not "do something" to mitigate this terrible evil. This is your amateur philanthropist all over. He gets harrowed himself, and takes the first opportunity that offers for making other people's flesh creep; but beyond this he can only suggest that somebody should "do something" to cut off the source of his sentimental distress. In the case of Dr. Macnamara, he proposed that the Local Government Board should initiate the practice of separating advances on land from those on buildings; and while allowing the former to be irredeemable, should allow the period for the redemption of the latter to be extended. If this were done, he thought the London County Council might be able to charge 4d. or 6d. a week less per room in their so-called rehousing schemes.

Mr. Flower, one of the Members for Bradford, declared that these suggestions were of a trivial character. He pointed out that the root of the evil of over-crowding lies very much deeper than could be reached by reductions of a few pence a week in the rent. That is a fundamental truth which perfunctory philanthropy does not take the trouble to appreciate. But Mr. Flower carried the campaign into the country of the municipalizers, by remarking that extravagance in building was the source of half the trouble. "They should bear in mind that it was only the very poorest class in the community for whom they had to provide." This declaration is dead against the London County Council, who have admitted their inability to grapple with the needs of the very poorest of the population, while spending the ratepayers' money lavishly on buildings which are snapped up by well-to-do artizans and others with money to spare. Mr. Flower suggested that the Local Government Board should issue to local authorities throughout the country a circular reminding them of their powers and responsibilities in this regard, accompanied by a plan.

Sir Albert Rollit called attention to the existence of a strong feeling among local authorities against the limited periods assigned by the Department for the repayment of local loans. As a lawyer, Sir A. Rollit was able to lay his finger upon a practical alteration of the law which has come to pass under the system of dealing with these loans followed by the Local Government Board. By the Public Health Act, 1875, money was to be borrowed for such a time not exceeding sixty years as the local authority, with the sanction of the Board, might determine. Actually, it is the Board who fix the period, often in conflict with the local authority. Besides, the Member objected to the arbitrary limitations imposed by the Board, which frequently mean that local authorities have to find between 6 and 7 per cent. on their capital outlay "before they can extract anything in the shape of remunerative returns." And a very good thing, too, as many ratepayers will be inclined to say! Sir A. Rollit's demand was for a maximum term of 100 years; for an extension of the time in respect of building; for the treatment of land as a permanent asset; and for a reduction of the number of local inquiries.

Mr. Bartley, another Metropolitan Member, was prompt to utter an emphatic protest against Sir A. Rollit's exaggerated municipalism. He denied altogether the mischievous presumption, the child of the Association of Municipal Corporations, that the rehousing of the working classes, or any other worthy and beneficent extension of the public works of local authorities, can be promoted simply by extending the number of years for the repayment of loans. This is not the way to municipal salvation. Mr. Bartley argued against the spread of the idea that the rehousing of town populations can only be done in a heroic manner by the local authorities, pointing to the costliness of the adventures of the London County Council in this direction. He considered the interference of the local authorities discouraged everybody from going into the enterprise. In his turn, Mr. Bartley was sharply taken to task by Mr. Duke, the Member for Plymouth, who could not defend the private enterprise under which the existing condition of the town populations has come to pass. This is a very fair point to take; but it by no means follows that the only remedy is an absolute alternative principle. Plymouth is a densely populated town; and although the Corporation have done something to cure some of the squalor which has existed there from immemorial times, they have been brought to a standstill by the impossibility of accommodating the people displaced by clearances. Mr. Duke credited the Liverpool Corporation, who have a comparatively free hand in the matter, with having practically solved the problem of providing house accommodation for the poorest members of the community. If this is true, it is a great glory for Liverpool; and it is a pity no member for the city found it his duty to tell the House something of the matter.

Of course, Shoreditch was heard from. This is a place where municipal dwellings have electric light laid on, charged for at something less than cost price. Naturally, the municipality want the repayment of the loan spread over 100 years, with a view to cheapening life in these tenements in other ways. Sir W. Foster thought local authorities ought to have greater powers for taking land required for building industrial dwellings upon; but he was also impressed with the difficulty of providing for the victims of municipal clearances. This speaker sounded a note of sympathy with the Department for having so much work to do upon limited means, and urged that much of the labour and expense of inspections might be saved by enlarging the powers of County Councils in this direction.

In replying upon the debate, Mr. Long dealt with the suggestion for the devolution of some of the work of the Department upon County Councils, and remarked that experience of the past does not encourage this idea. Such was the object of a Provisional Order made in 1889, which met with so much opposition that it had to be withdrawn. In 1898, a Committee of investigation into the work of the Department referred to this Provisional Order in their report, and remarked that the opposition had in no way abated. With regard to the burden of the Progressives' song—that local authorities should be allowed to spread the repayment of debt over 100 years, and hold land in perpetuity as an asset—Mr. Long replied simply that he had no power in the matter; it would require legislation. To the other charges, of lack of sympathy with the laudable aspirations of local authorities, and of usurpation of their prerogative for fixing the period of loans, Mr. Long answered with spirit and cogency. In his hands, Sir A. Rollit's point became a mere attorney's quibble. The Local Government Board have for a long time acted in the full belief that it is their duty not only to consent to the period of repayment, but to do so upon lines to be strictly laid down. It would never do to permit local authorities to put their own conditions upon proposed loans. Many things have to be considered. The Department, in entertaining such questions, take into account the previous indebtedness of the local authority, and also the probable life of the work for which the money is required. They have always been of opinion that they would not be justified in granting the maximum period stated in the Act for work other than of the most durable character; and the President sees no reason for departing from this view. So far from having deterred local authorities from doing good and necessary work, the indebtedness of these bodies had risen under the supervision of the Department from £92,820,000 in 1874-75 to £276,229,000. This does not look as if want of zeal and energy on the part of the Local Government Board had seriously hindered the local authorities in carrying out works upon which they had set their heart. On the contrary, most ratepayers to whom these words should come would be inclined to wonder whether the Department had not erred on the other side.

Mr. Long declared, very solemnly, that he and his predecessors in office had been actuated by the desire that the local authorities should realize their indebtedness, and that loans should be repaid within a reasonable time. Still, the amount of local debt has grown at the enormously rapid rate indicated by the figures. It is not for a moment suggested that there has been extravagance or folly on the part of local authorities. So long as the money is well spent, Mr. Long rejoices that the authorities realize their responsibility in regard to improving the conditions of life; but those who do such things should feel that the wholesome check of public opinion is upon them. Therefore, the Department hold that repayment of loans within a reasonable period ought to be maintained, and that this principle is in the interest of sound local finance. So this emphatic declaration ends what would in time have developed into a strong plank of the Progressive municipal platform. How unreal is the grievance put forward on behalf of the Associated Municipalities appears from the statement of the President of the Board that, out of 266 local authorities circularized with a view to ascertaining what they might be doing in the matter of housing, only 91 recommended the extension of the period of the loan as desirable and necessary; and only one pleaded the shortness of the period as affording an excuse for having done nothing.

Consequently, as the President reasonably argues, it is not so much the money question that stands in the way of something being done in this regard. What the real obstacles are was not even hinted; but their nature may be surmised. Speaking on a later occasion, under conditions of greater freedom, Mr. Long

again laid stress upon the bad husbandry of deferring the repayment of local debt, and pleaded for the co-operation of municipalities in the difficult task of finding a better way. Ignorance, extravagance, and incompetence are not to be pardoned on the simple score that posterity will be taxed to pay for them. That is the "short point" of the case as it now lies before the rate-paying public. If the public believes the London County Council style of housing is already as cheap and good as anything likely to be developed in the next hundred years, then there would be less objection to spreading the repayment of the original cost over this long period. But people do not approve of this kind of thing now; and the County Council themselves admit that the first part of the problem of housing—providing for the poor and needy—is beyond their powers. Why, then, should posterity pay for what even the present generation do not like?

Incidentally, the reply of the Minister to the new plea for the recognition of municipalized land as an asset, to be held against debt in perpetuity, is worth noting by those who are interested in any division of the landed property of a local authority. Why, it may be asked, should the freehold site of a gas-works or water-works be paid off for the sake of posterity? One answer is that it is practically impossible to draw the line between different categories of municipal property. Freeholds must go with the rest. Again, the valuation of land, apart from the use which is made of it, is a perilous matter. There is no standard by which such an appraisement could be satisfactorily made. One man would bring out the value of (say) a gas-works site, apart from everything else, at a trifle; whereas another, by an equally plausible reasoning process, would prove it to be the only valuable portion of the undertaking. Besides, who is to say that any assumed value would always remain the same?

It comes to this, that the established practice of the Treasury and the Local Government Board, in keeping local loans chargeable on at most two generations of ratepayers, is the only acceptable and safe rule. If, as Sir A. Rollit complains, this requirement means that the authority have to pay from 6 to 7 per cent. upon their borrowed capital before they can begin to extract anything in the shape of profit from the undertakings on which the money is spent, so much the better for trade. Any investor will put money into a 6 or 7 per cent. concern, without asking for the security of a mortgage of the rates; and the knowledge that municipalities inclined to go into trade must adjust their charges to clear this return first—unless they are content to come upon the rates for the difference—is likely to keep the field open for a healthy play of competition. Whatever the Associated Corporations may think, it is not good for them, nor for trade, that they should be able to hover at will over every kind of enterprise that attracts their fancy, and be tempted to plunge into it by the reflection that they can always get their capital cheaper than the private trader. According to Sir A. Rollit, this is not so; and it would be well for all municipal parties to recognize the truth, and accept the limitations of speculation that it entails.

## PUBLIC WATER SUPPLIES.

THE holding a fortnight since of the meeting of the British Association of Water-Works Engineers, of which a report appeared in last week's "JOURNAL," invests with additional interest the subject of public water supplies. Much has been said, and a great deal more written, upon this question, in its various phases; but investigation is always in progress, and the results have to be duly recorded. General principles can possibly be stated in simpler, and therefore more easily comprehended, language, and the path of the student or the young practitioner made smoother, or his time may be saved by his attention being directed to some source of information of which he is in search. The literature of water supply is thus continually being enriched—whether by the thoughtful paper contributed to the proceedings of a technical society, or by the published volume. The latest addition to it in the latter form recently came to us from across the Atlantic, in a work which represents the combined efforts of three authors—Mr. F. E. Turneaure, Dr. H. L. Russell, and Mr. D. W. Mead.* Mr. Turneaure is Professor of Bridge and Sanitary Engineering at the University of Wisconsin; and his collaborator, Dr. Russell, is Professor of Bacteriology in the same institution. The subject is therefore approached from the engineering and chemical standpoints. In the preparation of the book, the authors had in view primarily the needs of teachers and students in technical schools in America, in which, it is satisfactory to find, water supply receives a considerable amount of attention. In dealing with the various matters under their hands, they have endeavoured to lay stress upon fundamental principles rather than upon details of practice; though methods of construction have been given to illustrate those principles or bring out the effects of differences in conditions. With this idea in mind, they have subjected to analysis—confessedly more or less crude, but at the same time useful for directing attention to certain general laws and limitations—many problems which are usually treated empirically; believing that such analyses will assist in the utilization of the results of observation, and, if properly applied, aid materially in the cultivation of the judgment. With this brief introduction, we will proceed to give an indication of the scope of the book.

The subject-matter is divided into two parts—the first dealing with the requirements of consumers and the sources of water to meet them; and the second treating of the construction of works. In the first part there are nine, and in the second part nineteen chapters; and there is an introductory chapter, containing some interesting historical particulars, and a few observations on the value and importance of a public water supply. The first problem attacked by the authors is the quantity of water required; and from data they have obtained, which show a range of 6·6 to 59 gallons per head per day, they come to the conclusion that an allowance of 20 to 30 gallons for domestic use will be abundant. For commercial purposes, they put the average at 20 gallons per head; for public purposes, at 5 gallons; and they reckon 25 gallons per head as loss. They, however, give these as extreme figures. They next deal with the use of water for fires, the variations in consumption, and the effect thereon of the growth of cities. The sources of water, rainfall, evaporation, and percolation, the flow of streams, and ground water, are the subjects which occupy the succeeding chapters; and then we reach the important question of the quality of water. The four methods of examination—physical, chemical, bacterial, and microscopical—are described in succession, and the characteristics of different waters are pointed out. The first part of the book closes with a valuable chapter on the relation of water supplies to the dissemination of disease.

As already mentioned, the second part is devoted to the construction of works. The authors begin by describing their general arrangement, and then pass on to lay down some principles for their economical construction. Next follows a chapter on hydraulics, in which the method of calculating the rate of flow of water through orifices and pipes, over weirs, and in open channels, is explained. The six succeeding chapters are devoted entirely to constructional matters. In the first place, the proper point for the location of the intake, where the water is to be drawn from rivers or lakes, is considered. Where springs are to be utilized, the works necessary for collecting the water are described. The principles governing the flow of water into ordinary and artesian wells are explained, and then some details in regard to the construction of wells and filter-galleries are supplied. Having procured the water, the authors proceed to show how to store it, by taking up next the subject of reservoir construction. The use and value of storage are enforced at the very outset, and then some observations are offered as to the capacity, location, and mode of constructing reservoirs. The special features of earthen, masonry, timber, steel, and loose rock dams are successively discussed; this very important branch of the subject occupying some 80 pages. From storage the authors pass to purification. An outline of the methods employed is first given, and details follow. The chapter on sand filtration fully sets forth the virtues of this system of purifying water before distribution, for which, as we recently pointed out in the "JOURNAL," and as the authors acknowledge, credit must be given to the Chelsea Water Company, or rather to Mr. James Simpson, their Engineer. No reference to sand filtration can be made without the citation of the well-known cases of Altona, Hamburg, and Lawrence (Mass.) in proof of its efficacy in diminishing the death-rate from cholera and typhoid fever; and though, as the authors are careful to point out, a filter of the kind in question is not in any way an absolutely perfect means of purification, it is, as Fränkel has well said, "the best imperfect method that has yet been devised." Seeing that the introduction of this "imperfect" system into Lawrence—a city which was previously dependent upon the polluted water of the Merrimac—was the reduction of the typhoid rate by nearly 90 per cent., we think that he was not far wrong. Two chapters are devoted to mechanical filtration and to miscellaneous processes of purification, and these close this section of the second part of the book.

Having brought the water from its source, and prepared it for human consumption, the authors proceed to show how it is distributed. Pipes first claim their attention; and the relative suitability of the various materials—cast and wrought iron, steel, wood, cement, and vitrified clay—of which they are made, is discussed. Conduits and pipe-lines come next. These chapters are followed by one on pumping machinery, by Mr. Mead; and then the subject of distributing and equalizing reservoirs is taken up. A chapter extending over some 30 pages is devoted to the distributing system, an important feature thereof being the details relating to the fire service. The last chapter in the book is devoted to the operation and maintenance of the plant, the detection and prevention of waste, the use of meters, &c. The authors' closing observations are upon financial questions connected with water supply; such as the expenses and charges which have to be met, the relative cost of different services performed by water-works, the sources of revenue, and water-rates.

The foregoing epitome of the contents of Messrs. Turneaure and Russell's book, the text of which occupies 746 pages, and is illustrated by 231 figures, will give readers a good indication of the ground covered. It is not often that an engineer and a chemist are found associated in the production of a work on water supply; yet the subject is obviously one on which each should be able to bring his special knowledge to bear with advantage—to the practitioner not less than to the student. The latter will find in the book probably as much as he will be able to assimilate at the outset; and when he has mastered its contents,

* "Public Water Supplies: Requirements, Resources, and the Construction of Works." By F. E. Turneaure, C.E., and H. L. Russell, Ph.D. With a chapter on "Pumping Machinery," by D. W. Mead, M.Am.Soc.C.E., &c. New York: John Wiley and Sons (London: Chapman and Hall, Ltd.); 1901.

and is desirous of proceeding farther in his studies, he will be assisted in doing so by the facilities afforded him by the authors, who at the end of each chapter give a list of the best works on the subject dealt with. The value of such a list is not confined to the student; for the young water engineer may find it necessary to make a special study of some particular branch of his professional work, and may not know exactly in what direction to look for guidance. To the water-works specialist there is probably, as the authors frankly acknowledge, little that is absolutely new in their book. All they claim for it is that it presents in a convenient form a large amount of information which is now widely scattered; and for this reason they hope it will prove acceptable and useful to those who are busily engaged in the practice of their profession.

## THE GAS AND WATER STOCK MARKET.

**(For Stock and Share List, see p. 229.)**

THE week just closed had a very bad opening on the Stock Exchange. The tone on Monday was so depressed that Consols were actually sold at 91, beating all previous records in this generation probably. Then came the first announcement of a railway dividend. That was not too cheering; and later announcements only emphasized the depression. Happily some buyers were tempted by the low figures; and they checked the fall. The close of the week was lightened by the favourable intelligence from South Africa. On balance, however, prices, except for Americans, show a material reduction. The settlement was an insuperable difficulty to about half-a-dozen of the smaller names. The Money Market has not been much moved; but rates seem rather disposed to be a shade easier. Business in the Gas Market was only moderate on the whole—some days showing a little spurt of activity, while others fell very calm. In Gaslight issues, there was some moderate dealing in the ordinary at figures which gave no indication of change, the opening and closing bargains being at 95¼. The secured issues were more variable—the preference gaining a point, while the debenture lost an equal amount. The announcement that the statutory dividend will be paid next month seems to have satisfied the market, without heeding the fact that the balance to be carried forward falls from £221,000 to £98,000. This represents a shrinkage of £123,000—a sum equivalent to more than 1½ per cent. dividend for the half year. South Metropolitan opened with some promise of a rise, but could not quite manage it. Commercials were almost unnoticed. Absolutely nothing was done in the Suburban and Provincial group; but Southampton debenture rose a point. In the Continental companies, business was very slack; and the tendency was not in favour of better prices. But European held on steadily in spite of the reduction in the dividend. Among the remoter undertakings, Oriental had a further rise, on the strength of Government sanction to their new contract being accorded. The Water Companies were unusually busy, quite as active as the Gas Companies; but the tone continued rather flat, and one or two quotations receded.

The daily operations were: Monday's business in Gas was only moderate, and was mostly in Gaslight issues—the debenture falling 1. Tuesday was very quiet and featureless. Wednesday was only a shade better; and still there was no change. Thursday was much about the same in point of activity; but Gaslight preference rose 1, and Oriental fully paid and £4 10s. paid rose ¼ each. In Water, Southwark debenture fell 2. Friday was quiet. East London Water fell 1. Saturday was almost a blank day, and nothing moved.

**The Dividend of the Gaslight and Coke Company.**—We learn from the Secretary and General Manager of the Gaslight and Coke Company, Mr. John W. Field, that the accounts for the past half year show that (subject to audit) the balance to the credit of the net revenue account will enable the Directors to recommend the payment of a dividend at the statutory rate of £4 8s. per cent. per annum, carrying forward a balance of £97,993 12s. 10d. This time last year the balance was £296,755; while in February it was £221,570.

**Prize Winners at the Examinations in Gas Manufacture.**—We have received from Sir Philip Magnus, the Superintendent of Technological Examinations at the City and Guilds of London Institute, the names of the prize winners at the last examinations in "Gas Manufacture," the results of which were given in the "JOURNAL" for the 2nd inst. (p. 44). The following is the list of awards: Honours Grade—First prize, W. H. Johns; second prize, V. W. Theobalds. Ordinary Grade—First prize, T. Brooke; second prize, H. R. Davies; third prize, F. E. Ward. Mr. Johns, who comes out at the head of the list, is in the service of West's Gas Improvement Company, Limited, and he studied at the Regent Street Polytechnic. Mr. Theobalds is also a London-trained man. The winner of the first prize in the ordinary grade—Mr. Brooke—was prepared at the Greetland Mechanics' Institute; while Messrs. Davies and Ward studied at the Municipal Technical School, Manchester. We congratulate them all heartily on their initial success, and trust they may find scope for the exercise of the special abilities they have shown themselves to possess.

## PERSONAL.

Mr. WALTER LISTER has resigned his position of Gas Manager to the Aberavon Corporation.

Mr. WALTON MANGHAM, Assistant-Surveyor of Holmfirth, has succeeded to the position of Surveyor and Water-Works Manager.

Mr. JAMES GLAISHER, F.R.S., has resigned his seat on the Board of the Crystal Palace District Gas Company, and Mr. JABEZ LIGHT has been elected to fill the vacancy.

After 52 years of faithful service, Mr. CHARLES SELLERS is retiring from the position of General Manager and Secretary of the York Gas Company, in which he will be succeeded by Mr. LEAF, the Sub-Manager, whose place will be taken by Mr. HILL. In recognition of the valuable assistance Mr. Sellers has rendered in bringing the undertaking to its present prosperous condition, he has been elected to a seat on the Board.

In another paragraph, reference is made to the approaching relinquishment by Mr. BERTRAM STANWAY of his position as Assistant to Mr. W. R. Herring. The occasion has been chosen by the officers and staff at the Edinburgh and Granton works to testify their good feeling towards him by presenting him with a case of cutlery. This was done on their behalf by Mr. Herring, who desired Mr. Stanway to accept it as a memento of his association with the works, and as a mark of esteem by his fellow-workers. Opportunity was also taken to present Mr. EDWARD C. HERRING, who, as already mentioned, is leaving to join his father as Assistant-Manager at Dover, with a beautiful cigarette case, as a *souvenir* and testimony of the high opinion in which he was held by his *confrères* at the above-mentioned works. He leaves accompanied by every good wish.

At the offices of the Birmingham Corporation Gas Department yesterday week, Mr. J. H. LLOYD, the Chairman, received the deputation appointed at the recent private meeting of members of the Birmingham City Council, to convey to him the request that he would allow himself to be nominated next November as Lord Mayor for the ensuing municipal year. Since the meeting was held, a requisition in support of the resolution has been signed by every member of the Council. The requisition having been presented, Mr. Lloyd replied that he was highly sensible of the honour of receiving such a request from the whole body of the Council. As one of the youngest members of the municipal body, he felt some diffidence in undertaking such an important office; but in face of the unanimous and hearty invitation that he had received, he recognized that it was his duty to accept the nomination, which he did with very great pleasure.

The position of Resident Engineer for gas-works in Australia, for which applications were invited in the "JOURNAL" early last month, has been filled by the selection of Mr. BERTRAM STANWAY, Assistant to Mr. W. R. Herring, Chief Engineer and Manager to the Edinburgh and Leith Gas Commissioners; and he will leave England on the 2nd prox. to take up his new duties under Mr. T. J. Bush, M.Inst.C.E., Chief Engineer of the Sydney Gas Company, whose London Agents (Messrs. W. Coward and Co.) have conducted the negotiations in connection with the appointment. Mr. Stanway spent his pupilage at the Fenton Gas-Works, after which he became Assistant to Mr. Herring and his successor (Mr. E. A. Harman) at Huddersfield. When the former gentleman moved to Edinburgh, he was joined by Mr. Stanway, who was placed in charge of the building operations in connection with the new works at Granton. He has therefore had good all-round practical experience in the modern system of gas manufacture; while the extent of his theoretical knowledge may be gauged by the fact that he passed first class in the Honours grade at the last City and Guilds of London examinations, as already announced in the "JOURNAL" (*ante*, p. 44), and that he holds the highest honours for chemistry granted by the Science and Art Department, South Kensington. Moreover, he is courteous and gentlemanly; and his character and social standing are beyond reproach. The selection of just the right man for the position was by no means an easy task for the Company's Agents; but we believe that they have made a wise choice, and that those who are responsible for controlling the affairs of this important undertaking have secured a conscientious and energetic coadjutor.

## OBITUARY.

The death of Mr. C. H. Wiltshire, the Chairman of the Gorleston and Southtown Gas Company, took place somewhat suddenly last Friday week. He was a gentleman who had had a long public career.

By the death of Mr. JOHN COCKCROFT, of Littleborough, which took place on Monday last week, at his residence in the town, one of the few remaining gas managers whose life-work has been confined to one undertaking has been removed. Deceased had lived practically all his life at Littleborough; and in the early days of the gas-works, when they were in the hands of Messrs. H. & L. Newall, in whose service he was a clerk, he was engaged as meter inspector. When, in 1864, the concern was formed into a Company, Mr. Cockcroft was appointed Secretary and Manager—a position which he held till his death. Under his judicious guidance, the business increased; and the undertaking is one of

the most successful in that part of the country. He was one of the founders of the Manchester District Institution of Gas Engineers, of which only three—Mr. Harrison Veevers, Mr. John Booth, and Mr. James Braddock—remain. He joined the British Association of Gas Managers in 1867, and was a member of the Gas Institute up till the last. He was also a prominent Freemason—being one of the oldest Past-Masters of the Benevolence and Royds Lodges held at Littleborough, and P.Z. of the Benevolence Chapter; and he was connected with several local societies. Deceased had not been in good health for a few years; and last winter he was so seriously ill that he was practically confined to his house. Under these circumstances, the Directors of the Company thought it advisable last May to appoint a deputy, in the person of Mr. S. E. Halliwell. Mr. Cockcroft was 64 years of age; and he leaves a widow and three daughters. When the sad news of his death reached the workmen, they passed a resolution of condolence with Mrs. Cockcroft and her family; and the general respect in which deceased was held was manifested on Thursday, at the funeral in Calderbrook Churchyard.

# NOTES.

## Definition of Civil Engineering.

The correctness of Tredgold's famous definition of civil engineering as "the art of directing the great sources of power in Nature for the use and convenience of man," has often been discussed, and sometimes criticized. Recently it has been reviewed by several American engineers, some of whom question its accuracy, even for the time when it was written. Mr. J. W. Burke, in the "Engineering Record," remarks that even in early times the civil engineer could not claim to be the sole director of the great sources of power in Nature for the use and convenience of man. If there were then no chemists, there were physicians who, in a small way, employed the chemical forces of Nature. It is a more important objection, however, that the phrase "for the use and convenience of man" does not indicate the engineering character of the work. If a work were for the inconveniencing of man, or for the convenience of some and the inconvenience of others, like the Chicago drainage canal, it would not therefore cease to be civil engineering. Mr. Burke suggests, as a strict and rigid definition of civil engineering as at present practised, that it is "the art of skilfully building stationary economic structures." He thinks this is a homely phrase; but the worst of it is that it does not strike one as being English. Moreover, all engineering is not building. The suggestion, however, is merely thrown out as something to talk over, with a view to getting a closer definition of civil engineering than that framed long ago by the eminent carpenter.

## Wood Distillation.

Much persevering effort continues to be put forward, chiefly by German engineers, for the improvement of apparatus for the distillation of wood. The problem at present is the economical treatment of wood residues of various descriptions—sawdust, chips, and the refuse of the manufacturer of tanning extracts from bark and twigs. There is no difference whether the wood is in a fine state of division or not; the distillation products are the same. The present price of wood residues is so low, and the output so large, that the attraction of schemes for utilizing them is very great. Herr F. A. Bübler thinks that inventors of such processes as a rule have turned their attention to the wrong part of the plant. The number of continuous-acting carbonizing retort systems is great; but the success so far achieved by them is small. There is nothing in the continuous-acting idea. What inventors generally have overlooked is the fact that the chief practical and economical difficulty of treating this waste material does not lie in carbonizing it, but in preparing it for this operation and in obtaining the products in a sufficiently concentrated and marketable form. The stuff is excessively damp, seldom containing less than 60 per cent. of moisture, which should not get into the retort. Steam drying is too expensive, and fire heating drives off some of the volatile matters. Bübler suggests that the waste gases of the retort and boiler furnaces might be put to this duty. If the drying is done in a tube, this might at the same time be made to act as a mechanical conveyor. Hot gases in violent motion are very efficient driers. The carbonizing is done in an inclined retort.

## Blast-Furnace Gases for Power Generation.

Herr Lürmann has discussed the utilization of blast furnace gases as a source of power, in the light of experience gained in Germany and Belgium. It is regarded as established that the small proportion of combustible gases contained in these furnace gases presents no difficulty. A Körting engine is now being worked at Eisleben with gas having a calorific value of only 78·4 B.T.U. per cubic foot. A more serious objection can be taken to the dust and the water vapour contained in these gases. The dust is of two kinds—one coarse and heavy, consisting of particles of coke, limestone, and ironstone. This need never reach the engine cylinder, being easy to remove. It is the fine, light metallic dust which causes trouble, because it is so light that it will travel a long distance with the gas. It sometimes contains alkalis and salts, which mix with the lubricating oil, and give much trouble. To utilize blast-furnace gases in gas-engines, they must be specially and carefully purified both by the wet and the dry methods. This is the universal opinion in Germany. The complete removal of the light dust can only be effected by washing; but Messrs. Körting regard the practice as still in an experimental stage. It appears to require a large quantity of water and a large area of purifier space. Experiments have shown that, for every cubic metre of gas per minute, a sacking-and-sawdust purifying surface of one square metre is amply sufficient. The centrifugal process, with a wetted fan, is also used for this purpose. This is the only suitable expedient where a great bulk of gas is required to be treated, as the space occupied by, and cost of, fixed purifiers tends to become excessive.

## Strength of Masonry Arches.

The computation of the strength of masonry arches is one of the first things that most students of civil engineering aim at accomplishing; while they usually find the problem eluding their grasp to the end of their course. In a recent issue of the "Annales des Ponts et Chaussées," M. Legay has made an attempt to find a rational solution for the problem, upon a new principle. Nearly all writers on the subject start by assuming the form of the arch, and then they proceed by methods more or less intricate to find the conditions of equilibrium resulting from various loads. So long ago as 1859, M. Denfort-Rochereau announced that this procedure was wrong, and that only the load should be assumed as given, from which the form and dimensions of the arch to bear it should be computed for any required span and rise. This writer formulated the conditions of stability of a masonry arch in the following terms, which have not been bettered. First, the resultant of the pressures should pass through the middle of every joint, thus giving a uniform pressure over the entire surface. Secondly, the resultant of the pressures should act normally to every joint, thus requiring no other form of resistance, such as friction, to oppose sliding. Thirdly, the pressure per unit of area should be equal at all the joints. Lastly, the pressure should correspond to the maximum resistance which the material is capable of sustaining without alteration of its elasticity. Unfortunately, M. Denfort-Rochereau's analysis was complicated, and not conclusive. M. Legay resumes the task, and succeeds in constructing the curve of pressures, which is what Rankine styled a transformed catenary, but is called by M. Legay a catenoid.

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The estate of the late Mr. Frederic Lane Linging, whose death was announced in the "JOURNAL" for the 18th ult., has been valued at the net sum of £98,411.

According to a report from New York, Mr. Jones, the Assistant City Chemist of Chicago, claims to have discovered a process of producing electricity direct from coal. He has patented a battery which he asserts will yield 35 per cent. of the energy stored in coal, which is four times the quantity produced by the present combination of boiler, engine, and dynamo.

We have received from Messrs. Charles Griffin and Co., Limited, a "Handbook on Petroleum for Inspectors under the Petroleum Acts," &c., by Captain J. H. Thomson, His Majesty's Chief Inspector of Explosives, and Mr. Boverton Redwood, Home Office Adviser on Petroleum, and Consulting Adviser to the Corporation of London under the Petroleum Acts.

A very interesting visit was paid last Thursday by the members and associates of the Society of Engineers to the Staines reservoirs works, with which it was found great progress had been made. When completed, they will, as our readers are aware, afford an additional supply daily of 35 million gallons of water taken from the Thames. We have recently reported on the condition of the works, which are being carried out for the Staines Reservoirs Joint Committee by Messrs. Walter Hunter and Reginald E. Middleton, MM.Inst.C.E., the Joint Engineers.

We learn that the reservoirs now in course of construction by the East London Water Company, under the powers conferred upon them by their Act of 1897, are making very satisfactory progress. They lie to the north of the existing reservoirs, and are situated in the parishes of Walthamstow, Tottenham, Edmonton, and Chingford—partly in Essex and partly in Middlesex. Their capacity when filled will be 1200 million gallons. The filling channels are completed, and are about 1¾ miles in length. The upper channel, which is constructed of concrete, and lined with brindled bricks, joins the River Lea just above Chingford Mill. It is 36 feet wide and 5 feet deep, and is continued at this width as far as the pumping-station, beyond which it is reduced to 20 feet—the depth remaining the same. The reservoirs will be filled to about half their capacity by gravitation; the remaining half by pumping. Messrs. S. Pearson and Sons are the Contractors; and they have had an average of more than 1000 men employed on the work for upwards of two years, as well as four steam navvies. There are 20 miles of railway on the works, 16 miles of which are full gauge. Last session the Company obtained powers to construct additional reservoirs still farther north. Already upwards of 500 acres of land have been purchased, and notices to treat served for the remaining 500 acres; and the surveys are being pushed forward rapidly. The works have been designed and are being carried out by the Company's Chief Engineer, Mr. W. B. Bryan, M.Inst.C.E.

# TECHNICAL RECORD.

## SOCIÉTÉ TECHNIQUE DU GAZ EN FRANCE.

### Review of Proceedings at the Annual Meeting.

The Twenty-eighth Annual Meeting of the French Gas Society was opened on Thursday morning last. Dieppe was the town chosen, and the Gallery of its Casino was the meeting place. It may not seem to English ideas exactly the most suitable site—associated as it is with "Petits Chevaux" and other dissipations—for the discussion of gas technics; yet, seated by an open window, in full view of the Channel and its varied shipping, within sound of the sea on the shingle, one does not feel any the less able or disposed to give one's mind to the business in hand. Promptly at half-past nine, M. Piaton, the Vice-President, took the chair; there being about 100 members present. The absence of M. Alfred Lebon, the President, though not unexpected, owing to his continued ill-health, was much regretted; and, when later in the sitting, it was announced that he had decided to withdraw from the presidency, instead of continuing to hold the office, as is customary, for a second year, a resolution of sympathy, expressing a hope of his speedy return to health, was unanimously adopted. M. Piaton, now President, is the head of one of three Companies known as the Lyons group, through their head-quarters being situated in that city. Among them they control a large number of gas-works, chiefly in France and Spain; the other two Companies being directed by MM. Vautier and De Lachomette.

After a few suitable introductory remarks from the Chairman, the business items on the programme were gone through. The first was the election of members. As Honorary Members, Mr. S. W. Durkin, the President of the Gas Institute for the year 1901-1902, and Mr. G. G. Ramsdell, the President of the American Gaslight Association, were duly elected. There were in addition twelve full members and ten associates also elected, which go to increase the existing membership to 626—made up of 20 honorary, 500 corporate, and 106 associate members. In point of numbers, therefore, the position of the Société Technique is increasingly satisfactory. Having welcomed the new comers, the Committee's report was proceeded with, commencing with the record of the loss sustained by death during the year of eleven members and associates. Among them may be mentioned the name of M. Paul Desmazes, who, trained as a railway engineer, became an assistant to the Paris Gas Company in 1881, and died while Manager of the gas-works at Nimes. When with the Paris Company, a report of his on the construction and working of retort-furnaces was adopted; and his model of setting was reproduced in all their works. Another name that occurred was that of Mr. Frederick Drory, the Manager of the Imperial Continental Gas Association's works at Antwerp.

The Treasurer's report was next taken. It contained some figures of interest generally, owing to items in connection with last year's International Congress being included. The receipts during the year amounted, in round equivalent figures, to £1938, while the expenses incurred came to £2360, or a loss of £422. The amount put against "Congress expenses" is £381. But by far the largest item of expenditure, which will no doubt utterly astonish some of our own Gas Associations, is for "Publications," and figures at £966. But it was, of course, an exceptional year. The capital of the Society still stands at the satisfactory amount of £7656, instead of the £8146 of twelve months previously. No questions being asked on the financial report, it was adopted, and attention turned to the election of five members to serve on the Committee. Considerable interest was taken in this question, though the re-election of the four retiring members was a foregone conclusion. This proved to be the case; and MM. Visinet, Piaton, Deleury, and Brouardel were sent back again to the Committee in the order named, while the fifth place was filled by the popular selection of M. Gaston Gautier, of Havre, to whom congratulations were offered. The Office Bearers for the current year are M. Piaton as President, and M. Deleury as Vice-President; while MM. Thibaudet and Visinet again undertake the duties of Secretaries, and M. Marquisan continues to act as Treasurer. Thus was the morning's business gone through, and adjournment made till the afternoon.

Re-assembling in increased numbers, and with commendable punctuality, M. Duros, the Sous-Préfet, was found to be present to deliver the awards granted to foremen and workmen in gas undertakings having the longest and best records of service. Out of 59 applications, 46 prizes of 200 frs. each were given; the average length of service being about 30 years. In addition to this, the French Government awarded 17 medals; the oldest recipient being M. Ferdinand Lumel, Chief Accountant of the Union des Gaz Company, with a term of 47 years' service to look back upon. A report was then read, examining the merits of apparatus sent in for competition in connection with the yearly offer made by the French Society to devote, in whole or in part, 5000 frs. for any marked improvement in gas fittings or plant. Awards of 200 frs. each were made to the Société Française d'Incandescence and to the Société des Allumeurs, for what were described as "really practical" self-lighting and automatic extinguishing burners. A further gift of 100 frs. was made to MM. Boulanger and Roux, of Paris, for artistic chandeliers and pendants; and M. Devinat received 250 frs. for an improved fitting for service-pipes. In this manner do the Société Technique keep their eyes open for improvements, and stimulate healthy competition and progress.

The way was now clear to commence the reading of the 21 papers contributed by members. In the absence of the author, M. Cabrier, the first paper on the programme was not read. It described a new hand-charging machine, the principle of which was the projection of coal from a hopper into the retorts by a drum with four plates, caused to revolve by hand. Photographs of the little apparatus were given in the text. The first paper taken was on "The Mechanical Conveying of Coal and Coke in Gas-Works," and was by M. Henri Laurain The actual phraseology was not read; but the author fluently described the contents of his communication. He pointed out that there always had been some degree of hesitation in France to adopt mechanical means for transporting material; but he cited Rheims, Rouen, Dijon, and one or two other towns as exceptions. The consideration of the subject was divided into two parts, naturally enough—the conveying of the coal up to the retorts, and the removal of the coke to the customers' waggons. An ordinary illustration was given of filling a coal-store by elevators and conveyors; but no means were shown of automatically taking the material from the store to the retort-house. This was an important *hiatus* in the paper, which, though interesting and useful in its way, was of rather an elementary character. For the conveyance of the coal to the retorts, M. Rouget's system of the employment of the return chain of a De Brouwer coke conveyor was described. The coal is carried on the overhead chain, from which it falls into a shoot in front of the retorts, and thus supplies an ordinary charging-scoop. The arrangement does not appear to be a feasible one, as it is based on the assumption that a coke conveyor can be used equally suitably for coal; and, further, loss of time and waste of labour must inevitably occur in the charging operations. Details of a special charging apparatus were given; but these seemed to be very much on the same lines as Messrs. Biggs, Wall, and Co.'s "Rapid" machine. The second half of the paper, dealing with coke, referred chiefly to the De Brouwer conveyor; and it was estimated that small gas-works would, by adopting the arrangements described, save from 7d. to 10d. per ton of coal carbonized. In the brief discussion that followed, M. Godinet, of Lyons, questioned the advisability, or possibility, of using the same conveyor for bringing in the coal and taking away the coke; and the use of electricity as the motive power of such apparatus was referred to.

M. Bachelay then read a short paper on the "Adoption of Expanded Metal for the Construction of Purifiers." He referred to the building of masonry purifier-boxes by Servier in 1876 and De Lachomette in 1878, and also to the construction of combined metal and cement gasholder tanks by Monier in 1886, and Bouron in 1893. The author suggested the adoption of this combination for purifiers, and described some boxes recently built by him on this system at Toulon, where no difficulty had been experienced. There was no discussion on the paper. The meeting then passed on to M. Rouget's paper, dealing with "Wet Meters of Invariable Level and with Saturating Tanks." He had presented a similar meter to the Société Technique in 1868, the principle of which, as now, was the saturation of the gas with water vapour prior to its entering the drum. Details and figures were given; but no questions being asked, M. Fabre was called upon to explain his "Quick Method of Finding the Amount of Nitrogen in Sulphate of Ammonia." An actual experiment was carried out by the author, who seemed to have continual trouble to find his requirements; and though no doubt his method is a very useful one, a large majority of the audience must have remained unenlightened concerning it.

The President then requested M. Breittmayer to describe his "Denaphthalizing Apparatus for Illuminating Gas." The author remarked that obstructions arising from naphthalene could be avoided in two ways—first, by bringing the gas into contact with hydrocarbons, involatile at ordinary temperature, which dissolve the naphthalene vapours; and, secondly, by incorporating with the gas very volatile hydrocarbons, which impede naphthalene formations, and even cause the disappearance of the crystals should they occur. It is on the second principle that the author has proceeded; and his apparatus consists merely in a suitably arranged syphon for saturating the gas as required. A short chemical discussion followed, after which M. Lecomte (in some respects the "William Sugg" of France) held the meeting with his paper on "The Photometry of Incandescent Mantles," and a note on M. Croizat's method of classifying them. Although there is a very distinct relationship between the illuminating and heating power of gas, the author prefers to keep to the former as his standard, on account of its being more generally understood. Without describing in detail the course of the paper, it may be said that instructive contrasts between different methods of photometric and calorific measurement are made between those of M. Vautier and M. Croizat, and equations are worked out to arrive at a definite basis of comparison. The absence of the International Congress President was much regretted, as his experiments and figures were frequently referred to. It was also asked in the ensuing discussion, what the International Committee appointed last year in Paris for the elucidation of this question, were doing; and it was announced, amid some laughter, that they had only selected so far their Working Committee. Is it not time that something more was done, or are Gas Commissions going to

achieve for themselves the same reputation as that held by Royal Commissions?

The next paper was also on the subject of incandescent burners, and described the Kern and its applications. It was prepared by M. Litschfousse, who said that, compared with its extensive adoption in England and America, the Kern burner was but little known or used in France. Then followed a description of it; and its advantages were pointed out. Figures were quoted from "The Lancet" with respect to the efficiency of the burner for warming interiors, and other analyses relating to consumption and constitution of the gas and air used were given. The opinion of Dr. Vasey was also cited, that "the great heating power of this burner arises from its consumption of five volumes of air to one volume of gas, compared with the best bunsen burners." The reading and discussion of these seven papers concluded the first day's proceedings, and was quite sufficient technical food for an afternoon's sitting.

There was a still larger gathering of members at half-past nine the following morning (Friday), when the reading of the papers was continued. M. Dulac briefly described "An Automatic Apparatus for Weighing Coke," or perhaps it should be said for "measuring" it. An excellent working model was exhibited. It is a simple combination of elevator, screen, hopper, and measuring chamber. A conversational discussion followed between one or two members interested—among other points raised being the suitability of the screen for varying local requirements. A more important paper was that by M. Bouvier, who is a regular contributor to the transactions of the Société; his subject being "Cold Carburetting of Gas, and Carburetting of Air." The advantages of effecting the former by benzol were insisted upon, and an instance of one works was given where, on account of its use, the make of gas per ton of coal has been pushed beyond 10,700 cubic feet. The carburetting of air, as managed by the Compagnie Française du Gaz Aérogène, is now done in eighteen different localities in France. The resulting gas has, it was stated, a higher value than acetylene for lighting, heating and motive purposes. M. Bachelay, at Toulon, has adopted benzol enrichment lately with very good results indeed. The continuous introduction of 2 litres of benzol per 1000 cubic metres of gas before the station meter has, among other advantages, almost entirely prevented naphthalene stoppages, both in the gasholder and in the town mains. M. Bouvier concludes by saying that the enrichment of gas by benzol allows of maintaining, under all conditions, the lighting power required. By separating the question of illuminating power from that of carbonization, the latter can be carried out with regard to only the make per ton. M. Mallet vigorously discussed some of the facts and figures given in the paper, more particularly with reference to certain statements concerning the carburetting of air. A heated dual discussion ensued, in which the author hardly succeeded in maintaining the ground he had taken up. The next paper was concerned with the "Automatic Enrichment of Gas by Benzol," and was written by M. Lacaze. It was proposed to effect this *desideratum* in one of two ways. The first was by connecting the benzol-regulating cock to the bell of the station governor in such a manner that any increase of pressure by the latter would find its counterpart in the quantity of benzol released. The second way was to control the benzol supply by a connection with a governor indicator on the street main, so that any increased demand would augment proportionately the enrichment by benzol. It was thought that these two solutions would supply a want, enable the regular lighting power of the gas to be maintained, and also limit the consumption of benzol. These ingenious arrangements were well illustrated by drawings, and there were no further questions asked of the author.

Then came another paper on the "Enrichment of Coal Gas, and Its Influence on the Calorific Power." This proved to be one of the most interesting and valuable contributions to the whole proceedings. It was written by M. Verdier, who later on also gave another paper. The results of a large number of experiments were tabulated showing that with different quality gases (95 to 120 litres per carcel) there was much greater variation in illuminating power than in heating power. It was further shown that the latter depends on the composition of the gas; so that the illuminating power (say) of English, German, and French coals might be absolutely the same; yet the calorific power would in all cases be totally different. In conclusion, suitable reference was made to the investigations of Professor Lewes and of Mr. T. O. Paterson, of Birkenhead, into the heating power of mixed water and coal gas, though the absence of water-gas plant in France naturally diminished their interest. Though, as stated, the paper was a very instructive one, and thoroughly merited the praise it gained, its conclusions need not be altogether accepted, nor regarded as convincing. Among others, MM. Lecomte, Mallet, and Aguitton (the experiments of the last-named having been referred to in the paper) took part in the discussion.

On the announcement of yet another treatise on the "Enrichment of Gas by Benzol," though its author was M. Lecomte, the room was emptied of nearly half its former occupants. Members were beginning to think they were already pretty well saturated with benzol; and so perhaps the Casino Gardens, the sea-front, and other relaxations proved too strong. The President's bell—not a hammer—was called into use to restore quiet, when the author began, in the easy and rapid style of which he is a master, to go through his subject, without the aid of his paper or notes. The constitution of benzol, and its utility as an enricher compared with cannel and boghead were examined. Drawbacks of existing benzol apparatus were discussed; and the automatic arrangement of the Société des Huiles Minérales, of Colombes, was described. This was apparently on much the same lines as the apparatus detailed by M. Lacaze in his paper previously referred to. A comparison of the cost of enrichment by cannel and benzol is worked out in detail by M. Lecomte, with the result that he finds 1000 cubic metres of gas can be enriched by benzol for 46·95 frs.; whereas the same enrichment by cannel costs 50·75 frs. But (whether with justification or not, we will not stop to inquire) as he applies the cost of cannel enrichment to the whole daily production of gas, and that of benzol only to the gas sent out at night, he finds that the latter costs three times less than the former, or, per ton of coal carbonized, 1·22 frs. for benzol, and 3·65 frs. for cannel. Weariness of the flesh, and gastronomic considerations, lately lamented by our Premier, were no doubt the cause of there being no discussion, but a prompt adjournment to lunch.

These wants satisfied, a start was made in the afternoon by a short paper on an "Apparatus for Lighting Burners at a Distance," prepared by M. Dupoy, and which described the Barbillat system. The means employed are electrical; and an actual illustration was given. The cost of it, however—being about 20 frs. per burner—would seem to militate against its extensive adoption. The next paper was the second one by M. Verdier, "On the Influence of the Physical State of Coal on the Quality of the Distilled Products." Results obtained from large, small, average, and powdered coal were described as well as tabulated. Naturally enough, the advantage of carbonizing large pieces was established. The discussion turned on the extent of breaking required by different systems of carbonization—inclined retorts, stoking machinery, &c.

M. Jouanne was responsible for the next paper on "The Manufacture of Water Gas by Dr. Hugo Strache's System." It was a rather long and tedious communication, and as the system has recently been fully described in the "JOURNAL," it need not be dwelt upon, except to say that a full description of the various kinds of producers for different fuels is given. Also, the old question of danger to health arising from the distribution of water gas was considered at some length, and experts' opinions were quoted. An evident desire to cut short the paper and the following discussion manifested itself; and it was with some relief that the author of the next paper on the programme was not to be found in the room, and so M. Bruyère's description of M. Gobbe's "Quenching Producer" was not heard. M. Bachelay then very briefly explained a modification made to the "Serment Respiratory Apparatus," for enabling gas workers and others to breathe in an impure atmosphere. With a paper by M. Leclerc, written originally for last year's International Gas Congress, but hardly considered quite suitable for such an assembly, on the establishment of reserve funds for the gas industry generally and gas employees, the reading of papers was finally brought to an end. Thanks to their authors were then passed; and M. Cornuault, the representative of the Société Technique during their visit to England, was called upon to make a few remarks on the nature of the London Gas Supply. The geographical position was explained, and comparisons were made between the gas consumption of London and Paris; it being about three times more per head in the former than the latter. Reference was also made to the extent of the manufacture of water gas in England, and to the authorization of the South Metropolitan Gas Company to reduce the illuminating power of the gas they supply. The President, M. Piaton, then declared the 28th annual meeting of the Société Technique du Gaz at an end.

Omission must not be made of the social side of the programme, however, for the entertainments enjoyed deservedly set in relief the hard technical reading and application of the members present. The annual dinner was held in the Casino on Thursday evening, and was attended by 130 persons, all seated at one long table. The Sous-Préfet (M. Duros) was present as the representative of the Government of the Republic, and the Mayor of Dieppe (M. Coche) represented the town. In the few speeches that were made, the good relationship existing between the municipal authorities and MM. Eugène Lebon et Cie., who light the town as the Compagnie Centrale du Gaz, was dwelt upon. M. Leclerc, as the Gas Company's representative, expressed his pleasure at welcoming his colleagues and fellow-members in such numbers to Dieppe. On Saturday, there was a full day's programme organized by MM. Lebon et Cie. Starting at 8 o'clock in the morning, a visit was paid to the sub-station of the Electric Lighting Department, which is also in the hands of the Gas Company. Over a dozen breaks took the members to the gas and electric light works outside the town. The former are in course of a much needed reconstruction; and the outside swivel pipes of the gasholders were noticeable, among other somewhat old-fashioned plant. After a pleasant three-hours' drive through the historic forest of Arques, its ruined castle was reached, where lunch on the sward was served. M. Leclerc, representing the absent hosts, took the chair. In a short speech he thanked all for their attendance and said that they anticipated the visit to England, of which representatives were present, with great pleasure. After M. Piaton had spoken, Mr. Brady, of the European Gas Company, rose, and on his own behalf and that of Mr. C. E. Brackenbury, who was also present, thanked the Compagnie Lebon for their generous hospitality, and said that the same cordiality that had been extended to them would, he was sure, be returned to the members of the Société Technique during their visit to London. M. Visinet

made a humorous speech in broken English, after which the return drive, with a halt for the examination of the lighting arrangements at Ailly Lighthouse, was commenced, and Dieppe was reached at 7 o'clock in the evening, after a most pleasant day of relaxation.

In conclusion, it may be said that the whole arrangements of the meeting, both on the technical as well as on the festive side, were must successful in quality and in variety. The business transactions were greatly facilitated by the tactful conduct in the chair of the President; and the social functions were admirably looked after by M. Leclerc and his assistants, and the officers of the Société Technique du Gaz.

On Sunday afternoon, nearly 100 members left Dieppe by the boat for Newhaven, thence for Brighton and London, eagerly expecting a pleasurable sojourn in England; the full programme of entertainment provided for them there having caused considerable comment of satisfaction, and hearty expressions of anticipatory thanks.

## DIFFERENTIAL RATES FOR GAS.

By Herr W. von Oechelhaeuser, Managing Director of the German Continental Gas Company.

**[A Paper read before the Meeting of the German Association of Gas and Water Engineers at Vienna, June 17.]**

(*Concluded from* p. 146.)

There are, therefore, intrinsic and authoritative reasons in support of the system of dual rates on economical grounds, provided in future matters can be so arranged that only a small number of duplicated meters and services are required; and thereby their inconvenience, both in use and in making up the accounts, is reduced to such an extent that it may be completely ignored. There is, moreover, another economical aspect of the question, which makes it look in the highest degree questionable whether the example of a uniform price all the year round should be followed by many works. They are face to face with constantly rising wages, continually increasing prices of coal, and, more particularly, constantly growing chemical competition on the part of coke-oven works in respect of all bye-products, and are therefore in a position in which it seems to the author very hazardous to lower the price of gas for illuminating purposes without absolute necessity—always assuming that the price is a moderate one for the neighbourhood in question, and that there are no special reasons for desiring an increase in the consumption for illuminating purposes. Just now there is absolutely no justification for a general lowering of the price of illuminating gas. It would be justified only, on the one hand, by the influence of competition, and, on the other hand, out of regard for the less prosperous classes of the population.

In support of this view, the author would point to the reduction in the price of gas which has taken place from the earliest years of his Company's existence. From average receipts of about 8s. 6d. per 1000 cubic feet in 1858, there has been an almost continuous drop to about 3s. 10d. last year. On the other hand, the retail price of petroleum (in Germany) is higher now than in 1877; and in some of the intervening years—*e.g.*, 1895—it has risen suddenly to very much higher figures. But of at least equal importance as the continuous fall in gas prices is the enormous cheapening of gas lighting, which is to be attributed not only to the price of the combustible, but to a better duty from new burners and the employment of incandescent mantles. Diagram 3 (p. 210) shows that a source of gas-light, 14 English candles mean horizontal intensity, is obtainable through the best incandescent burner of 1901 at one-ninth the cost for gas of what it was through the batswing burner of 1887. Therefore, the author thinks that any dissatisfied gas consumer in a place where a moderate gas price prevails may rightly be referred to this fact, and advised to get rid of all old burners and to procure the best new ones. Diagram 3 likewise shows clearly how, even since the invention of the Welsbach light—and, indeed, since that of the improved Welsbach light of 1892—the cheapening of gas lighting has continued to advance, through the improvement of both burners and mantles.

Thus, in the year 1892 the Welsbach burner consumed one-sixth of the gas which had formerly been required in the batswing burner to produce the same light; while the best incandescent light of the present day, and the Lucas high-pressure incandescent burner, show only one-ninth of that consumption. [The value stated for the duty afforded by the Lucas light is an average of 100 hours in use; while the rest of the figures for incandescent burners are average values over 300 hours use. In general, therefore, the Lucas light is not more economical than the recognized ordinary incandescent lights. Its advantage lies in its great power as a source of light.] With the present results of incandescent lighting, however, perfection has by no means been reached, as is clear from the fact that the best incandescent burners so far utilize only 2 to 3 per cent. of the available heat of the gas. Thus, looked at from the scientific standpoint, it seems that considerable advances must still be expected, of which also the activity of the incandescent lighting industry is always affording fresh evidence. On the other hand, an efficiency of 30 per cent. is already attained in the latest gas-engines, which compares with a utilization of 15 per cent. of the steam in steam-engines. Further advances are therefore only to be expected in a much smaller degree; and assistance to this method of employing gas appears to be justifiable, which, in the author's opinion, is not the case with gas used for lighting purposes.

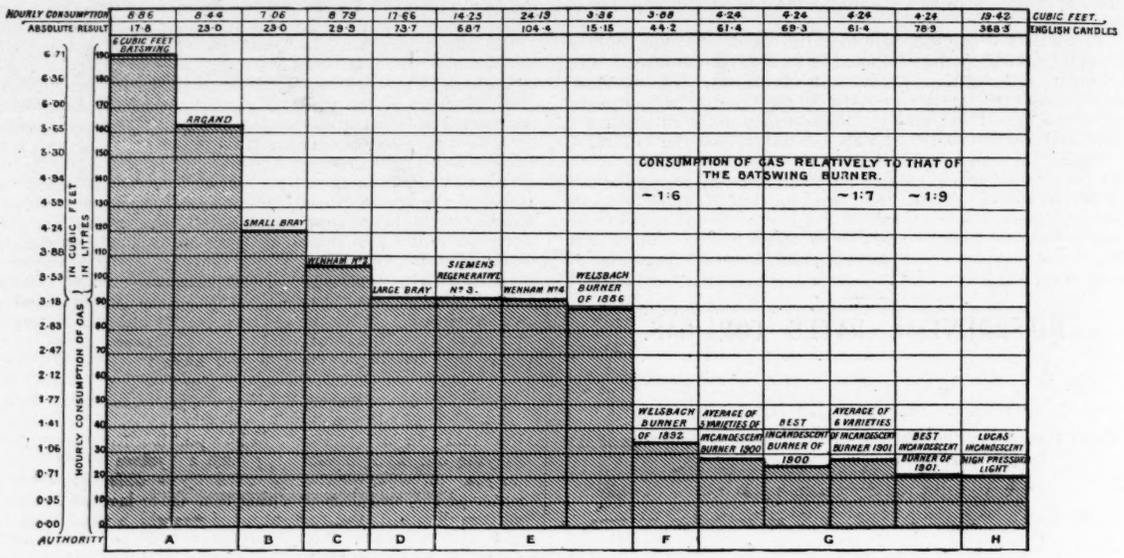
Diagram 3 shows further that there has take place, since the invention of the new Welsbach light nine years ago, a reduction in the cost of gas lighting of about 50 per cent., quite apart from any reduction in the price of gas. Even if the best results of incandescent lighting are disregarded, and only the average of numerous measurements during the years 1900 and 1901 is taken, there is still found to be a cheapening of 20 per cent. By reason of these results, one is indeed forced to the conclusion that, in place of a uniform price being adopted, the price of gas for lighting ought to be kept as high, and that of gas for technical purposes as low, as possible. The example of the electricians would thus be followed, and the difference in the prices rather increased than diminished. Herr Grohmann, of the Dusseldorf Gas-Works, has actually followed this plan, and has fixed 4s. 6d. per 1000 cubic feet for the price of gas for lighting, and 2s. 3d. for technical uses; thus maintaining a difference of 50 per cent. Other municipal gas undertakings have followed on the same lines, though not actually with the same prices; as, for instance, Magdeburg, where gas for lighting costs 5s. 1d. per 1000 cubic feet, and for technical uses 2s. 8d.

Certainly in many cases it will be possible to rest satisfied with carrying out and maintaining such a system of dual rates all the year through, without proceeding to different summer and winter prices, and thus attaining that more favourable and more uniform disposition of the output of gas which was shown in Diagram 2 (*ante*, p. 145). Anywhere, however, where the consumption of gas for lighting increases too slowly, and the number of duplicated services ought to be rapidly diminished, it is highly desirable to lower the price of gas for lighting in the summer to the price which is charged throughout the year for gas for technical uses. Then consumers of large quantities of gas for heating and cooking, or for industrial purposes, who now employ duplicated services, will give them up, and instead pay the higher price of gas for lighting during the winter, because in the summer—when they use more gas for cooking, for instance—they will secure the lower price without having the duplicated service. On the other hand, the larger consumers of gas for technical purposes, such as the possessors of gas-engines, will pay all the year through the lower price for gas supplied by a special service for technical uses, which price will be the same as the summer price for all gas. This, which may be designated the mixed dual-rate system, must likewise be recommended equally with the other system of dual rates throughout the year which is now prevalent, especially for the many cases where it is desirable to reduce the number of duplicated services and meters. In this respect, it affords the whole of the advantages of the system of one uniform rate for the summer and another uniform rate for the winter; while it does not injuriously affect any considerable consumption of gas for technical purposes.

Finally, Diagram 4 shows how gas lighting stands in price with respect to competitors. It will be seen from this that, at the assumed prices, which apply to North Germany at the present time, incandescent gas lighting, when compared even with petroleum, is light for light, still about 66⅔ per cent. cheaper than lighting with a petroleum lamp. Thus, even the absolute cost of a "Gem" burner is about 25 per cent. less than that of an ordinary small circular-burner petroleum lamp; while it gives more than twice as much light. Therefore, even with a view to a further extension of gas lighting among the poorer classes of the people, a decrease in the price of gas appears to be unjustifiable, more especially when it is borne in mind that, for the reasons stated above, it is not certain that it will not be necessary within a few years to again raise the price of gas. But it is well known also that the introduction of gas lighting among the poorer classes depends directly not only on the price, but frequently much more on relieving them of the initial cost of installing it. Hence the author believes that it is more correct economically, and of much greater direct value to the poorer classes of the people, to provide house connections and fittings under the most favourable conditions possible.

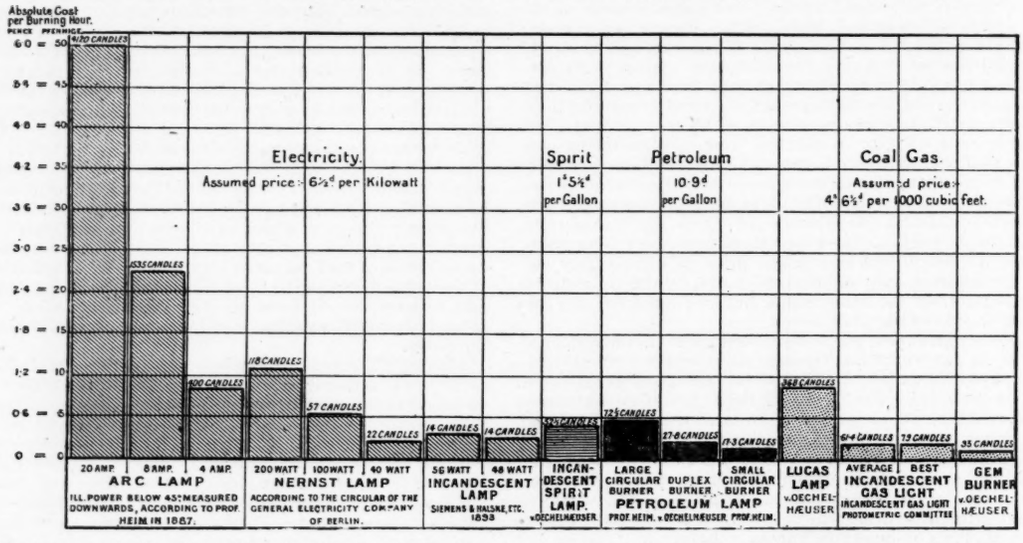
For instance, a gas-pipe should be laid gratis even to the top floor; and, most important of all, prepayment meters should be fixed. These enable even workmen to burn gas at the standard prevailing price. For the rest, not only competition and economical relations, but also many hygienic considerations—among others, smoke abatement—are strong evidence in favour of gas being disposed of as cheaply as possible for industrial and power purposes, especially to large consumers. For small consumers, indeed, the lowering of prices in the summer ought to suffice to induce them to use gas, especially for cooking, without the necessity for duplicated services and meters. Reforms of gas-rates should, in the author's view, aim not at a complete avoidance of duplicated services and meters, but at a considerable diminution of their numbers. For examples, it is only necessary to refer to the coal, spirit, and iron trades, in addition to the kindred industry of electricity supply. In the latter, to the best of the author's knowledge, dual rates prevail almost exclusively; and, as already pointed out, the differences between the two rates are more than double those which are found in the gas industry. This system of rates, indeed constrains the gas industry to compete with electricity supply by means of a system of similarly graded dual

DIAGRAM No. 3.—*Consumption of Gas per Hour, with the Most Usual Descriptions of Burners, for the Production of a Light of 14 English Candles Average Horizontal Illuminating Power.*




*Authorities.*—A C E. Professor Heim ("Journal für Gasbeleuchtung," 1887, p. 671). B D. ("Hütte" 1893, II.).
F H. W. von Oechelhaeuser. G. Incandescent Gaslight Photometric Committee.

DIAGRAM No. 4.—*Absolute Cost of Running the More Common Sources of Light of 14-Candle Power and Upwards.*




rates. Electricity works have been founded during the last ten years chiefly by municipal authorities; and the author is not aware that there has been any impeachment of the system of dual rates as a matter of public policy. No electrician thinks of sacrificing the electro-motor to the uniform rate system from considerations of convenience. Gas men, therefore, must take it that it has been fully recognized in electricity supply that the system of dual rates is completely justified on its merits.

While the author has sought to "break a lance" on behalf of different systems of dual rates, he nevertheless, for the reasons mentioned in the beginning, is far from rejecting the uniform rate system under all circumstances. Thus, where, through a rapidly growing population, there is such an increase in gas consumption that it is scarcely necessary to fight against competition, and the gas-works' managers concerned have an anxious time in satisfying the natural and rapidly increasing growth, the uniform price is to be commended until suitable land is found for a new gas-works. Similarly, many gas-works authorities might attach little importance to the consumption by gas-engines, because either the prices of electric current are too cheap, in consequence of the existence of water power, or because the electricity works, as well as the gas-works, are in the hands of the municipality; and, perhaps, in order that the electricity works may pay, it is still more important to make the consumption uniform throughout the daytime and the summer in their case than in that of the gas-works.

Finally, there is the important difference in any question of reform of gas-rates between works which are owned by municipal authorities themselves and those owned by private companies. The municipality is a law unto itself in the matter of gas prices, and can easily disregard the dissatisfaction of those classes of consumers, such as the possessors of gas-engines, who experience an increase in the price of gas when the uniform rate system is introduced. It is, moreover, in the position of being able readily to increase its price for gas, as has been done by many towns in recent years, when circumstances require such an increase in consequence of rising coal prices and wages. It is another matter, however, with private companies who have to seek such compensation; for every change of rates made by them is naturally regarded only as a new means of enriching themselves. With them also any discontent always excites a powerful outcry—intensified as it were by a sounding board—and consequently they are practically prevented from making any increase in the price of gas. Probably, any discussion of this communication will reveal as many different views and hypotheses on the question as are to be found exemplified in actual practice. It remains, therefore, only to recommend all local authorities who are in matters of policy in the same position as the private companies, or are under similar business conditions, as well as the many municipalities who have done so well under the system of dual rates and great differences between the two rates, not to allow themselves to be ensnared by the seductive charms of the uniform rate system, but, like the electricians, to remain true to the system of dual rates; or, failing that, at least to introduce, by way of compromise, a system of mixed rates, which does not relentlessly sacrifice the large gas-engines—which have formerly been the best friends of the gas industry—to the electro-motor, and does not ignore the hygienic advantages which accrue to towns from heating by gas on the large scale in industrial and technical operations.

*Discussion.*

At the conclusion of the reading of the paper, which was received with hearty applause, a lively discussion ensued, of which we give below a translation of the brief official report in the "Journal für Gasbeleuchtung."

It was opened by Herr Schimming, Manager of the Municipal

gas-works at Berlin. He said that he did not take the author's standpoint; but he submitted that the conditions were different in different towns, and that it was impossible to give one general rule applicable to all cases. Municipalities regarded the matter in a different light from companies, and industrial towns viewed it differently from non-manufacturing towns. In Berlin, about three-fourths of the total consumption of gas went for industrial uses. In particular, the managements of municipal and private gas-works adopted different standpoints. Many things commended themselves to the managers of municipal works, which the managers of private gas-works could only undertake under compulsion. It might be said that the municipal bodies took a broader and loftier view of the question. The small increase in the price of gas for power purposes in Berlin was of no moment for industrial concerns, as other factors had greater effect on the price of products than the cost of motive power. In Berlin, it was a question of competing with petroleum by means of a lower price of gas for lighting purposes.

To this, Herr von Oechelhaeuser replied at once. He emphasized the opposite point of view—viz., that the public interest generally did not require a uniform price, especially in view of the great benefit to small establishments of a considerably lower price for gas for cooking purposes. Furthermore, it was impossible to compete with petroleum, even with a still lower price for gas for lighting purposes. Public interests, indeed, demanded lower prices of gas for technical uses, not of gas for lighting purposes. At lower prices industrial consumption might be secured, as the construction of Dowson gas plant was generally attended by impossible difficulties in the matter of concessions.

Herr Müller, Manager of the Charlottenburg Gas-Works, next spoke in favour of a uniform price for gas for both heating and lighting. Experience thereof at Charlottenburg had been very favourable; and the day-time consumption had increased very rapidly. Especial value must be attached to the great convenience of the uniform price system. Herr Merz, the Manager of the Cassel Gas-Works, was of opinion that there was no reason for adopting the lower uniform price. Charlottenburg experience, indeed, showed that the net profit was thus considerably reduced. On technical grounds, also, connected with working arrangements, the uniform price appeared unfavourably. A better system was that of two prices for gas for other purposes than lighting—one for the summer and another for the winter. This system had proved very satisfactory at Cassel. Day meters and night meters should also be borne in mind; they were being introduced as an experiment at Cassel. The question was further discussed by Herr J. Körting, of Hanover, Herr F. Schäfer, of Dessau, Herr Gröhmann, of Dusseldorf, Herr Joly, of Cologne, and Herr Muchall, of Wiesbaden. The opinion that municipalities adopted a different and broader point of view of the question than companies was especially attacked. Experience of the uniform price at Wiesbaden had been favourable, and it had proved to be particularly beneficial to small establishments.

Herr von Oechelhaeuser, in his reply to the discussion, laid stress on the advantage offered by separate services for gas for lighting and cooking purposes in the control which was thereby afforded over the consumption of gas for cooking, and the consequent avoidance of waste. Experience of the uniform price at Charlottenburg had been too brief to be conclusive. If the price of gas for motor purposes was made an exception from the otherwise uniform price, then the system of two prices was again accepted. He concluded by expressing a wish that all efforts directed towards the solution of the question of differential rates for gas might prove of benefit to the gas industry.

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Professor A. W. Rücker, who, it may be remembered, was for some little time one of the Metropolitan Gas Referees, has been appointed Principal of the University of London. Professor Rücker is Secretary of the Royal Society; and we believe it is his intention to resign this position at the next anniversary meeting. He is President of the British Association this year.

A shaft for a tunnel under the Mystic River, built for the Metropolitan Water Board by Mr. Charles A. Haskin, of Boston, is noteworthy, says the "Engineering Record," for the timber lining for a part of its length. In the last report of Mr. F. P. Stearns, Chief Engineer of the Metropolitan works, it is stated that about 45 feet of the shaft consisted of 8-feet cylinders of ½-inch steel plates. Three 9-feet lengths were set up on the deck of a lighter and partially lined with brick masonry. This 27-feet section of the shaft, weighing about 40 tons, was then lowered into position and allowed to settle into the river bottom. Two additional sections were belted on and lined with brickwork, an air-lock put in place on top of the shaft, and the construction of the remainder of the shaft carried on under an air pressure of 20 to 29 lbs. per square inch. Below the steel cylinder the shaft was lagged with wood 5 inches thick. When the required depth was reached, about 3 feet of portland cement concrete was placed on the bottom, and a lining of brickwork built up to the bottom of that inside the steel cylinder. The material penetrated was 3 feet of mud, 11 feet of clay, and 21 feet of sand and gravel. The water is from 15 to 20 feet deep at low tide. The tunnel has been driven with a circular shield about 9 feet in diameter and 4½ feet long, forced forward by hydraulic jacks in the usual way. The lining was wood, 5 inches thick; the staves being cut from 2-inch spruce plank. Inside this was brickwork washed with cement; the finished diameter being 6 feet.

## DETECTING AND PREVENTING THE POLLUTION OF PUBLIC WATER SUPPLIES.

The first paper read, and the only one discussed, at the recent meeting of the British Association of Water-Works Engineers was by Mr. William Watts, the Engineer of the Little Don Valley Water-Works of the Sheffield Corporation, and it bore the above title. We give the main parts of the contribution, and a *résumé* of the very full discussion.

The author's remarks are intended to apply exclusively to moorland drainage areas; and he sets out by referring to the difficulties of detecting and preventing pollution which are often experienced owing to the conflicting interests involved in the ownership of the property taken or affected. The troubles inseparable from the selection of a good drainage area are laid bare; and he strongly advocates that the choice should be left to trained engineers, chemists, and geologists. He points out that the meaning of the word "pollution" has not been clearly defined by chemists and bacteriologists, nor is it understood by the public.

Coming to his subject, he says: The fouling of moorland waters by ordinary denudation can be prevented by the adoption of the methods described. The purity of the water can be maintained to some extent by keeping up a constant change and circulation in the supply reservoir. The in-and-out flows require to be evenly balanced; and the water should not be allowed to remain too long at one level, but should be lowered and raised as frequently as possible, especially in the spring of the year, when it swarms with the lower forms of aquatic life. The ova, at this time deposited on the sides of the reservoirs, are destroyed, together with the vegetation which finds shelter and support in the shallow water. Exposure and change bleach discoloured water, and frequent decanting is generally beneficial. The water stagnant in the bottom of a reservoir does not appear to rise to the surface; and thus the benefits of oxidation and purification by exposure are lost. Such water should never be used for domestic supply, but should be drawn from as freely as possible when in wet seasons the supply is plentiful, and be given as compensation water. It frequently happens, especially in new reservoirs, that water drawn from the higher level is clear and inodorous, while the bottom valve is discharging water offensive both to smell and taste. Too much importance cannot, therefore, be attached to the placing of draw-off valves at different levels in the valve-well. Purification begins at the surface, and much time is required for the suspended matter to pass through the lower layers of water and reach the bottom.

Flood water should not be allowed to enter a reservoir from which the supply goes direct to the consumer, unless it be subsequently filtered. Ever then it is better to keep it out, and supply water derived only from the streams in a normal condition of flow; the flood water being collected and stored in a separate reservoir, whence it can be drawn off when sufficiently clarified. This method, besides providing a purer and greater supply of water, enables the suspended matter to be deposited where it can be removed without interfering directly with the town supply. Heavy floods do not occur more than two or three times a year, and seldom last long. While the volume discharged is great, flood water is not necessarily the most dangerous water flowing from a drainage area. Unless flood-water courses be provided, separation is impossible. Moreover, if flood water is allowed to enter a reservoir at the head of the works, it has a tendency to drive the clean water over the waste weir.

Of course, land drains connected with dwelling-houses and farm buildings should not be allowed to discharge into the lateral feeders of a reservoir; and when the physical features of the land do not admit of some system of drainage being carried out, intercepting wells or cesspits should be constructed, so as to arrest the sewage, which should thence be regularly carted away from the drainage area, or be spread on permeable substrata, where it would be effectually filtered and rendered harmless. The safest plan, however, is to purchase the drainage area, and remove all possible sources of contamination.

Some reservoirs are, in a measure, protected by the reservation of a narrow strip of land between the top-water level and any adjacent fields likely to be manured. Manure so placed upon land is, however, liable to be washed off, and so get into the reservoir during heavy rain, especially in frosty weather, and where the ground slopes steeply towards the reservoir. Attention should also be given to the land drains discharging into the streams that feed the reservoir, which naturally occupies the lowest position in the valley.

Water plants should not be allowed to grow in the shallow margins of a reservoir, and constant weeding is necessary in the spring of the year to keep them down. To prevent and to further check their growth, the sides should be pitched with stone; and the water drawn down as frequently as possible, in order to destroy the roots as well as any ova deposited upon the vegetation and stone pitching. The shallows of a reservoir afford suitable spawning ground for frogs, which, with the opening of spring, crop up in great numbers, and render the appearance of the water very offensive. This spawn should be collected as soon as it appears, and be buried in lime and soil some distance away.

Fish should not be allowed to multiply too freely, and care should be taken to exclude all but the cleaner kinds. Fish act

simply as scavengers, and as such their presence in reservoirs is beneficial; but they do not otherwise purify the water. However, it may be, generally speaking, taken for granted that the fewer the forms of life in water, the purer it is; but whether it is, therefore, more wholesome is an open question.

Trees, although objects of beauty in a landscape, are not always desirable. They prevent evaporation and a free flow of water off the land, and consequently springs are more abundant where forests exist. They should not, however, be allowed to remain where falling leaves can find their way into drinking water—in fact, vegetable matter of every kind should be kept out of streams and reservoirs used for domestic supplies. Such vegetable matter may not be actually unwholesome in itself; but as it provides food and shelter for aquatic life, which is objectionable, it is better kept out of the water.

The sources of pollution hitherto referred to may be prevented either by the purchase of the gathering-ground, by the proper construction and arrangement of the works, or by good management. But pollution is sometimes found to exist on a watershed which it is not easy to detect or remove, such as that occasioned by denuding agencies, and the erosion of the exposed surface of the land, by the solvent power of the water, by objectionable mineral springs, the decay of vegetation, road washings, and matter from dwellings. By purchasing the drainage area, some of these sources of contamination may be removed, and others rendered less injurious; but pollution of some kind will nearly always exist in spite of every reasonable precaution that may be taken.

The purity of moorland water depends very much upon the character of the streams from which it is derived or conveyed to the reservoirs; and to prevent disintegration, the main feeders should be pitched with rubble stone, and the adjacent springs and swampy ground be drained direct into them. Water from peat beds is also very much improved by draining, especially those higher areas from which most of the water is derived. A few leading drains will suffice if opened out and carried deep enough in the right direction. Where stone is not available, open cuttings answer very well; but in a spongy subsoil, the sides require support and protection.

Intercepting or wreck lodges placed across a stream will arrest coarse *débris*, and prevent much silting up of the reservoir. These require cleaning out from time to time when dry weather permits. All that is wanted is a strong rubble embankment, with a draw-off pipe at the bottom, and a bye-pass to be used while the cleaning out is in progress. They need not be water-tight, or deeper than from 6 to 9 feet; but the level of the streams will in all cases determine the depth.

The collecting and storing of a town's water supply should be carefully attended to at its very source, whether it be afterwards filtered or not. Streams, drains, and springs are too often neglected, and because of their distance away are only visited at long intervals.

With regard to the action upon lead of certain waters, several methods for preventing this have been suggested; but no effective plan has, so far, been introduced whereby the acidity of the water is entirely removed so as to satisfy engineers and chemists. Peaty water does not of itself appear to be injurious to health; but the acid it contains acts powerfully upon lead, and may dissolve sufficient to cause lead-poisoning. The remedy which finds most favour with engineers is to pass the water through a layer of chalk or limestone chippings, placed among the coarser material of the filters below the sand. Soft water when brought into contact with limestone liberates carbonic acid gas, and causes a deposit of carbonate of lime to form on the surface of the lead, which prevents any further solvent action taking place. But whether this coating is sufficient to permanently resist the action for all time, it is impossible to say; and it is obvious that, if this coating goes on accumulating, the pipes must become seriously reduced in size.

There is need for a metallic service-pipe which, while equal to lead in ductility and strength, would have, in addition, the power of resisting the solvent action of water charged with peaty and other acids. New piping is more readily acted upon than old, and probably a baser metal than lead—if one can be discovered—is all that is required. In recent years iron piping has come into more general use; and there is no reason why it should not be even more extensively employed.

The time has arrived when spun yarn should cease to be used in making the joints of socket pipes, and cold lead rings substituted. The fibre of the yarn is vegetable material, and in the course of time decays and pollutes the water. Some engineers have dispensed with it; and the author sees no reason why others should not do likewise. It has occurred to the author that these cold lead rings could be forced in by hydraulic power, and thus save the expense of firing, making joint holes, and setting-up, as in the case of molten lead joints. The sockets could also be shortened. The standardizing of pipe sockets, too, is a thing greatly needed. It would simplify and probably cheapen the manufacture of pipes generally.

No water supply from such sources as have been indicated can be considered as sufficiently pure for domestic use unless it is filtered immediately before it passes into the supply mains; for while it may be potable and wholesome without filtration where arrangements exist for effective decanting, yet *cyclops* and other low forms of life are liable to go with the water into the mains; and thus find their way to the consumers. Screening the water through fine gauze is sometimes substituted for filtration; but it is neither satisfactory nor so effective as the latter.

In regard to the distribution system, the author advocated constant flushing. Dead-ends, he also said, should not be allowed, and complete circulation of the water should be ensured, as it is not improved by being kept too long in the mains, whereby the benefit of oxygenation is lost.

*Discussion.*

The President (Mr. W. A. Richardson) spoke of the seriousness of taking gathering-grounds where sources of pollution existed, which pollution had afterwards to be dealt with in a costly manner. Pollution from lead pipes had been a very dangerous matter from time to time in some districts. On the other hand, there was the difficulty that with iron pipes corrosion quickly took place; and they had to be renewed after a few years' use. In Birkenhead they had tried all kinds of pipes, and found that even coated ones did not last long. As to the danger of using spun yarn, that could to a great extent be avoided by using turned and bored pipes. They used nothing else in Birkenhead, excepting where they had occasion to make bends.

Mr. D. M. F. Gaskin (Liverpool) had had experience of putting in galvanized iron and wrought-iron pipes; but they had not been successful. Some years ago block-tin pipes were tried. He did not know for what reason they were dropped; but he knew there was a difficulty in making the joints. As to turned-and-bored joints, they overcame the difficulty so far as yarn and lead joints were concerned; but they were not always applicable in districts where the ground subsided. He agreed with the author as to doing away with yarn. Solid lead joints admitted of the use of shorter sockets, and obviated the great contamination that came from yarn. It was often found that corporations would accept tenders for yarn which was not fit to be used, and would not pay the price for the best yarn or stuff that was put on to the market, and which would not affect the water. Water engineers were judged a good deal by what they were bound to carry out through the ratepayers and other people wanting everything done on the cheap. Free circulation of water was, in his opinion, an absolute necessity for the purity of water; and dead-ends were dangerous in case of fire. Regarding the standardizing of pipe sockets, he pointed out that the general complaint of the iron founders was that every engineer had his own special fad. In one foundry that he knew of, there were no less than eight different patterns of 18-inch pipes sent out for eight different engineers. With due regard to the district and the pressure the pipe would have to bear, they could well accomplish the standardizing of the sockets. As to the screening of water through wire gauze, that ought never to be done as a substitute for filtration.

Mr. R. H. Swindlehurst (Bolton) held that corporations and water authorities should have full control of the areas of land from which their supplies of water for domestic purposes were collected, and for this purpose should, when practicable, become the owners of, and so be able to protect, the gathering-grounds. The consequences of not being owners were these: That so long as people were allowed to do what they liked with their own land, they were at liberty to build houses to any extent, to cultivate fields, and to establish mines or factories. If they did these things to any great extent, and some of them to even a small extent, in the neighbourhood of a reservoir, it became a serious matter, and might necessitate the expenditure of large sums of money in buying up rights of this kind to keep the water pure. In the early part of 1893, he recommended his Committee to purchase the watershed areas, so far as the water for domestic supply was concerned; and they had carried out his recommendation to a very large extent. Out of a total of 3241 acres, they had purchased 2356 acres, and at a reasonable cost. They had no compulsory powers to do this; the land was all of it bought by arrangement. In this way, they prevented as much contamination as they possibly could.

Mr. C. H. Priestley (Cardiff) remarked that Mr. Watts laid great stress on the constant changing of water in storage reservoirs. If they had storage which was greater than the supply required, they could do this very much easier than if working near the mark. But few towns at the present time had sufficient storage to do quite what Mr. Watts suggested. In his own case, he drew the compensation water entirely from the reservoirs; and this kept the water in circulation. As to the question of buying up the gathering-grounds, that was most desirable; and many wealthy corporations had done it. The cost, however, was a factor for consideration, and rendered it impossible in all cases to buy up the entire area. Where no houses existed, purchase of the whole area, although desirable, might not be necessary. The action of peaty water on lead pipes was found in many instances; but not in all. In Cardiff, it had no action on lead pipes, nor had he found the slightest trace of lead poisoning. He endorsed the author's views as to the use of spun yarn. In Cardiff, they had not used it for years on the larger sized pipes, but had not given it up entirely for the smaller sizes. Although he had shortened his sockets considerably, there was a danger in shortening them to any great extent. With short sockets, they could not get round bends so well as with long ones. It was not possible in all cases to do away with dead-ends; and where they could not be avoided, there should be frequent flushing.

Alderman E. P. Bovey (Torquay) stated that his Corporation had purchased the watershed—something like 2300 acres; and the first thing they did was to remove every inhabitant, and then

demolish the dwelling-houses. Then they proceeded to fence off a zone all round the streams and reservoirs, and formed a natural filter drainage all round, so that no water could flow off the land direct into the streams or reservoirs. Although this had only been in operation twelve months, it had effected a wonderful improvement. In addition to this they had, under the advice of their Engineer (Mr. W. Ingham), erected fine wire screens on the streams at various points, so as to form silting ponds. In this way, the vegetable matter was held back, and easily cleansed. The point which was exercising his Committee at the present time was the question of dealing with the land they had available, which was formerly used for general farming or agricultural purposes. They were not allowed to so utilize it now; and their Medical Officer would have no artificial manure used on it. The questions before them were, Was it most desirable to let the land go fallow, or to introduce sheep farming—that was, outside the fenced zone? They had persuaded the Council to allow them to make an experiment with sheep farming. With regarded to iron pipes, they found them utterly useless, as they soon became corroded. They principally used lead; and the pipes speedily became thinly coated. There was no difficulty from corrosion or anything else.

Mr. A. J. Price (Lytham) said his district was supplied from an upland surface; and they had had typhoid fever with them more or less. In most places, supplied with a surface water, there was typhoid fever. Some three or four years ago, he helped to compile some statistics comparing the deaths from typhoid fever in towns supplied by wells, rivers, and surface waters. It was found that the towns with water from rivers—such as London, Reading, and Worcester—had less deaths from typhoid than the towns supplied from gathering-grounds and upland surfaces. He could not help thinking this was largely due to the fact that the towns supplied from gathering-grounds did not filter their water. Shortly after he took up his present position, they doubled the filtering area, and practically eliminated the typhoid. There was nothing now that could not be traced to drinking water from wells, or that was imported into the town. He thought it would be much cheaper to filter water than to buy large gathering-grounds.

Mr. Hamlet Roberts (Ipswich) pointed out that in many cases there was a difficulty in making joints without spun yarn. As to turned and bored joints, they were very good and useful where they had straight roads; but in old-fashioned towns, with narrow winding streets, there was great difficulty in using them. Regarding the forcing of lead rings in by hydraulic power, this would add a great deal to the cost of the joint. He agreed on the point as to standardizing pipes; but he did not see how they could avoid dead-ends.

Mr. G. W. Lacey (Oswestry) observed that there was no question as to the desirability of filtering water if the town could afford it. In his own case, they did not filter, but the water would no doubt be better if they could do so. At the same time they did not find that the supply was in any way detrimental to health. Regarding lead pipes with peaty water, he had found no particular action going on. As to joints, he had adopted ring leads instead of yarn; and he did not find them at all bad things. Respecting the last speaker's remarks, typhoid was not endemic at Oswestry; and he should imagine it was more so with river than with either upland or moorland supply.

Mr. Price remarked that the statistics could be easily obtained and verified.

Mr. Lacey said he was sorry to hear it then. As to dead-ends, he pointed out that every street was not mated to another; and it was too expensive to run two mains to avoid the dead-ends.

Mr. C. Sainty (Windsor) said he had found iron pipes a great nuisance. Where contractors built houses, and ran in 14 feet length of iron pipes, and then there was a burst, it sometimes meant opening up half across the road to find it. He believed in obtaining, if possible, a standard socket for iron pipes; but as for forcing in lead jointing by hydraulic power, he was afraid they would have many sockets go wrong quickly. As a rule, men employed to lay mains did not care if they put on 100 or 500 lbs. pressure to drive the joint in. He believed lead was the proper thing for joints and not yarn. In an old town such as his, with narrow twisted streets, and irregular levels, it would be very difficult to have all turned-and-bored pipes.

Mr. C. E. Jones (Leyton) said he should not like it to go forth that all peaty waters contained acids capable of dissolving lead, because that was not a fact. Many waters of a peaty colour were among the most healthy. As to Mr. Watts's recommendation of quality instead of quantity, the cry now was for more water; and Parliament would seldom pass a Bill for the supply of water which did not contain provision for some 20 to 25 gallons per head. It was quantity as well as quality that the engineer of the future would be compelled to provide. In his opinion, it was unfortunate that many towns boasted such little storage capacity. He admitted the difficulty of defining pollution, and then went on to say that the term "pure water" was very much abused by those connected with water supply. He dealt at length with these points, and then commenting on the author's apparent objection to very deep reservoirs, said if they were very shallow, vegetation was encouraged, and grew luxuriantly. He disagreed entirely with the statement that flood waters should not be allowed to enter reservoirs. It had been proved in the Thames Valley that flood waters were not by any means so polluted as water flowing in the summer time when the stream was low. Most engineers now preferred flood water to water which was flowing in dry times, and when there was little of it. His experience of moorland water had been varied; and it came to this: That waters with less than 5° of hardness were dangerous with regard to absorbing lead; but anything over 5° was perfectly safe. In his following remarks, he urged the necessity of purchasing gathering-grounds. But admitting that in cases there were difficulties, he contended that, in the absence of acquiring the land, he thought inspection should be permitted at all times by those interested in the water supply. As to wrought-iron pipes, he had not used them for a quarter of a century; and he would not advise anyone else to do so. Lead piping was the thing; and there was no danger in its use.

Mr. W. G. Peirce (Richmond) said the author had referred to water in reservoirs lying in particular strata. He had had some experience of (if he might use the term) stratification at the Canterbury Water-Works, where the water was softened by Clark's process in large reservoirs. Lime water was introduced into the reservoir first, and the hard water was pumped from the wells into this reservoir. On one occasion, finding that, when the reservoir was within one-third of being full, the lime had failed, he endeavoured to overcome the difficulty by introducing some fresh lime water from No. 2 lime-water tank. This was admitted about 6 feet from the bottom of the reservoir; and the hard water continued running into the softening tank until it was filled. But on delivering this water into the town, a chemist (who was a Director of the Company) noticed that the water, on being put into a glass bowl, killed his leeches; and he discovered there was an excess of lime in the water. It appeared that the lime water which he (Mr. Peirce) had introduced to make up the deficiency in the strength of the lime had evidently laid in a stratum by itself; and as the float on the surface of the water (which conveyed the water to the pumps supplying the city) reached this stratum, it took in the lime water—thus proving the stratification. Regarding dead-ends, he likewise agreed that it would be too expensive to make the pipes all circulate.

Mr. W. Ingham (Torquay) held that it was not always necessary that upland moorland water should be filtered. It depended upon the class of the gathering-ground. If they had peat in large areas, no doubt the water would want filtering; but if they had rocks and very little peat, then it seemed to him to be only common sense to keep the pollution out of the water rather than let it go in, and then have to get it out again. Some of the speakers appeared to think there was no such thing as typhoid from filtered water. They were entirely in error; and for an illustration they had only to go back to the epidemic in 1893 at Paisley. He proceeded to give an idea of the pollution that could take place from leaves by quoting from the report of Professor Brown to the Massachusetts Board of Health. The figures showed that it was not advisable to have trees on the banks of reservoirs; and at Torquay he (the speaker) had had all trees cut down. At some length he called attention to the question of bacteria in different layers in a reservoir, and said it was a peculiar fact that there was not always the same number at all times of the year in a pure water reservoir.

Mr. Watts, in reply, said it seemed a very simple business to get rid of dead-ends by returning the pipes; but doubtless there were cases where they could not be avoided. He admitted that it was not safe to use turned-and-bored pipes where the ground was likely to settle. On the question of jointing, he said that in the case of some big pipes he was laying at the present time—two lines of 33-inch and 20-inch, lying side by side, in a trench 7 ft. 6 in. in width, so that there was space between them—he was giving no less than 5s. for cutting out the joint holes. That was more than 1s. a yard; and he felt sure that the 5s. could be saved if some engineer or pipe founder would come forward and present them with a machine which would clip the pipe and force the lead into the joint, so that it was impossible for the pressure of water to blow it out again. As to filtering water instead of purchasing the drainage area, if they had a nuisance and could prevent it, he said by all means prevent it, rather than allow the nuisance to exist, and then have to take it out of the water afterwards. Regarding storage, he should err on the side of having too much; but, on the point of flood waters, he thought Mr. Jones had not taken into consideration the difference between river and moorland flood waters. It was discoloration rather than anything else that it was necessary to take out. Respecting the degree of hardness of water, he thought if they had a moorland water of from 4° to 5° or even a little more, it might be considered very satisfactory.

A hearty vote of thanks was passed to Mr. Watts for the paper.

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**Private Bill Legislation.**—A parliamentary paper has just been issued furnishing particulars as to the number of Private Bills deposited and Royal Assented in the past three sessions. In 1898, the numbers were 250 and 206; in 1899, they were 270 and 215; and in 1900, 268 and 231.

**Iron and Steel Institute.**—The autumn meeting of the Institute will be held in Glasgow from the 3rd to the 6th of September, concurrently with the International Engineering Congress, Section V. of which embraces subjects connected with the two minerals with which the Institute is identified. Among the papers (twelve in all) down for reading, is one "On the Profitable Utilization of Power from Blast-Furnace Gas," by Mr. B. H. Thwaite; and another "On a Mechanical Gas Producer," by Mr. B. Talbot. A number of visits have been arranged.

# REGISTER OF PATENTS.

**Mixing and Burning Gas and Air for the Production of Light and Heat.**—Bower, G., of St. Neots. No. 10,432; June 7, 1900.

This invention has for its object the provision of means whereby the mixture of gas and air is "rendered very complete," whatever the relative proportion of the ingredients.

The patentee proposes to place within a tube of any suitable size and material, a tubular cylinder composed of metal, glass, porcelain, cement, or any fictile material. The cylinders are perforated in the direction of their length by parallel cylindrical holes, in diameter about one-half of that of the cylinders themselves. On the top of the cylinder already within the tube, is placed another similar one externally, but with the central hole conical in shape or gradually increasing in diameter from the bottom to the top. At the bottom it may be of the same diameter as that of the parallel hole through the lower cylinder; while at the top it may be about twice as large. Thus these two tubes, when placed in position, practically form, to all external appearance, a plain cylinder; while internally there is firstly at the lower portion of the cylinder a parallel-sided cylindrical hole, and in the upper portion of the cylinder the hole widens towards the top, and so forms a trumpet-shaped or conoidal passage.

At the top of the cylinders or cylinder, is a cap (of metal or other suitable material), covered at the top by a perforated disc, or by a circular piece of gauze—such gauze or perforated disc being preferably formed of a material which does not readily oxidize or become deteriorated by the passing mixture of gas and air, and which may be ignited and burnt above the perforated disc or gauze.

The enveloping tube is attached to a holder perforated at the bottom for the admission of air; and at the bottom of it in the centre is an induction-jet, through which the gas, mixed or unmixed with air, is propelled, and issuing from the jet or nozzle with considerable velocity is enabled to draw with it, through the perforations at the bottom of the enveloping tube, a considerable quantity of air—such air becoming intimately mixed with the inflammable gas as it passes through the cylindrical and conoidal holes in the cylinders within the enveloping tube. The mixture is rendered yet more complete by the perforated disc or gauze which forms the burner.

The quantity of air to be drawn in and mixed with the induction-jet is regulated by a perforated covering-plate so as to vary the size of the holes through which the air is induced; but both it and the gas may be regulated by another device, which forms an important part of the invention. Round the bottom portion of the enveloping tube is placed a sleeve, which may be readily moved up and down the enveloping tube; and to the sleeve is attached a wire passing upwards to the top of the mantle. By moving this sleeve up and down, more or less of the mantle is exposed to the action of the mixture of gas and air, so that when the quantity of gas is reduced, so also may the amount of mantle to be rendered incandescent thereby. In this manner, says the patentee, whatever portion of mantle is exposed to the flame is rendered highly incandescent, and so gives a light proportionate to the amount of gas consumed and to the area of surface of the mantle exposed to its action. The moving of the mantle up and down by means of the sliding sleeve is thus tantamount to decreasing or increasing the active size of the mantle.

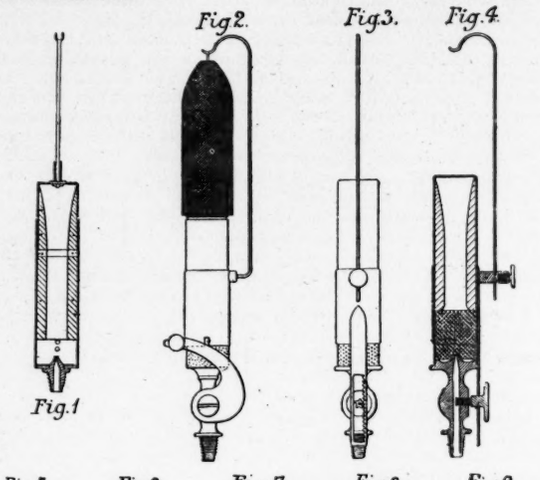
By another method, the mantle is maintained at the same height and the sliding sleeve is attached to, or forms part of, that portion of the apparatus which carries the perforated disc or gauze forming the burner; so that this latter is moved up and down within the mantle, and the same effect of varying the surface of mantle to be rendered incandescent is obtained, and an amount of light is realized which is proportionate to the amount of gas consumed.

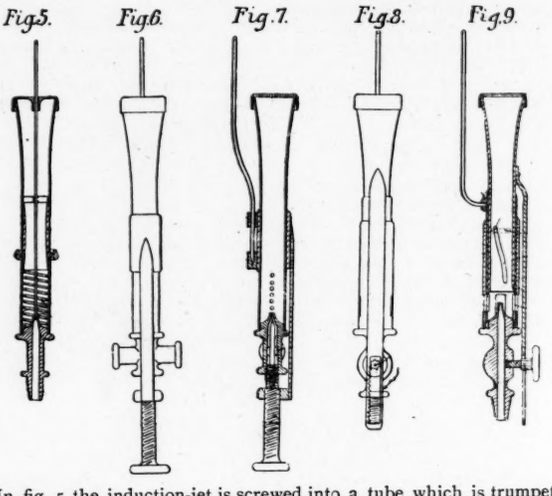
The sliding sleeve may also be made to cover or uncover the holes which admit air to be drawn in and propelled by the induction-jet; so that the air admission is also suited to the gas consumption. In this case, the air-holes may be formed around the lower portion of the enveloping tube, which contains the cylinders in which the gas and air are mixed together.

Again, the sliding sleeve which varies the amount of mantle to be exposed to the action of the flame, may be made so that, by its movement, it may regulate the gas supply as well as the air. Thus when a certain amount of light is required, the gas consumption, quantity of air, and area of mantle to be exposed are all regulated together. The maximum of light" is obtained for any given consumption of gas; and since the air supply is reduced with that of the gas, the liability of burners to fire-back, and to ignite at the induction-jet, is completely avoided."

Another form of burner prevents shock by vibration by fixing a straight tube of any suitable diameter into a shield having a perforated bottom-piece, into which an induction-jet can be fitted. At the top of this tube is a larger one, which may contain the lower portion of the cylindrical piece of fictile material which has the conoidal hole in it, and which carries the burner. This cylindrical piece has a flat bottom to it, into which is fastened the straight tube of lesser diameter already referred to—such diameter being about the same as with that of the smaller or lower portion of the conoidal hole in the cylindrical piece which rests in the holder with the flat bottom, but does not touch the sides of it. On the top of the shield (which may be perforated and tapering from a small diameter at the bottom to a larger one at the top) is inserted a perforated plate, through the centre of which the small tube passes to the bottom, and is screwed into it just over the induction-jet and air-inlet; and at the same time the holder which is screwed on to the top of the small tube keeps the perforated plate in its place on the top of the shield, which latter also carries the glass chimney, into which air can pass by means of the holes in the perforated plate at the top of the shield, and by the perforations in the shield itself.

Fig. 1 illustrates an incandescence burner arranged in accordance with the first part of the invention. In fig. 2 the arrangement of the tubes of fictile or other material is similar to that shown in fig. 1, but outside of the external tube is a tube or sleeve which slides up and down, and so opens, or closes, the perforations in the lower part, and regulates the quantity of air which may be drawn in by the induction-jet. Figs. 3 and 4 show a different manner of attaining the same object of regulating the gas and air supplies and the amount of mantle to be exposed at one and the same time.




In fig. 5 the induction-jet is screwed into a tube which is trumpet-shaped at its upper portion, and is provided at the top with a perforated disc in the centre of which is a guide, through which a rod may freely pass. The lower end of the tube has a spiral slot cut in it as shown; so that the bottom portion of the induction-tube is virtually a metallic spiral, the spaces left between the convolutions of the spiral being utilized in the first instance as a means whereby air is admitted to be acted upon by the induction-jet. In figs. 6 and 7 a similar external tube is used, provided with perforations at its lower end. In figs. 8 and 9 another modification of the invention is carried out—viz., keeping the mantle at the same height, but raising or lowering the top of the burner within the mantle.

**Gas or Air Compressors and Pumps.**—Keith, J., of Farringdon Avenue, E.C. No. 13,926; Aug. 3, 1900.

This invention relates to gas compressors or pumps of the kind described in patents No. 14,057 of 1897 and No. 15,291 of 1898, wherein a bell dipping into water, reciprocated by a small water-motor, serves as a pump to force the gas or air into a gasholder or receiver, the rise and fall of which is arranged to control the supply of water to the motor. The present improvements have for their object the provision of apparatus adapted particularly for dealing with comparatively small volumes of gas.

There is a weighted gasholder dipping into an annular water-space between an outer and inner cylinder, and a plunger or pump-bell having an upwardly opening valve on its upper end, in combination with a motor, the piston of which is directly connected to the pump-bell. The main valve in the motor is composed of two pistons of unequal area; the smaller one being arranged to control the passage of pressure water to, and exhaust water from, the under side of the motor piston. An auxiliary valve actuated by tappets on the motor piston-rod, is arranged to control the passage of pressure water to, and exhaust water from, the underside of the larger piston of the main valve.

**Gas or Air Compressors or Pumps.**—Keith, J., of Farringdon Avenue, E.C. No. 14,026; Aug. 4, 1900.

This invention relates to apparatus of the kind described in patent No. 14,057 of 1897; and it has for its object the simplification of the motor and valve gear so that a considerable piston speed may be obtained without fluctuation of the gas pressure due to the quick reversal of the stroke of the piston.

The compressor or pump, gas admission and discharge valve box, and the gasholder are arranged as described in the earlier patent; but two pumps or compressors are employed for supplying a single gasholder, and the water admission and exhaust controlling valves of these pumps are connected so as to prevent fluctuation of pressure. Each pump is provided on its upper end with a water cylinder, in which the admission and exhaust ports are arranged (as in an ordinary steam

cylinder), and a double-acting piston reciprocating therein is controlled by an ordinary slide-valve. The piston-rods of the motors are directly connected with their respective pumping-bells, and rods may be provided between the motor and pump cylinder, with a cross-head carrying a portion of the connections between the motor and the slide-valve. The piston of one motor actuates the slide-valve of the other motor by means of an arrangement of levers and links, or by gearing or otherwise—provided the piston-rod of one motor is connected with the slide-valve spindle of the other motor, and that the motor pistons are arranged to follow each other; one being preferably at the end of its stroke when the other is at its mid-stroke. The pump cylinders are each provided with admission and discharge valves arranged as described in the 1897 patent. The pumping-bells are counterbalanced by weights attached to cords taken over pulleys and secured to the crossheads of their respective motor pistons; and the gasholder is provided with guide-pillars on which the water-supply cock for the motor is fixed—a lever secured to this cock being actuated by the rising and falling of the holder.

The apparatus is intended to be used for increasing the gas-pressure of a low-lying district automatically, but may also be employed for high-pressure incandescent lighting or for mixing gases.

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**Internal Combustion Engine.**—Bouvand, A. B. de, of Paris. No. 15,474; Aug. 30, 1900. Date claimed under International Convention, April 2, 1900.

This invention relates to an internal combustion engine, wherein an explosion occurs at every two revolutions, working on a four-phase cycle constituted so as to produce at the first revolution: (1) Explosion and expansion during the entire first forward stroke of the piston, (2) expulsion of part of the combustion gases during part of the backward stroke, and (3) compression of the remaining burnt gases during the remainder of the backward stroke. At the second revolution, there is produced: (1) Expansion of the compressed burnt gases during part of the forward stroke of the piston, (2) inhalation of fresh mixture during the second part of the forward stroke of the piston, (3) exhaustion of the remaining gases of combustion during part of the backward stroke, and (4) compression of the fresh charge of gas during the second part of the backward stroke of the piston.

The following are said to be the advantages of this cycle: (1) The burnt gases may be totally expelled. (2) Expansion double that of ordinary engines. (3) No toothed or other gearing for positively opening the exhaust-valve. (4) Compression occurring at every revolution, there is no change of direction of the strains, and therefore no shock.

The effect of the compression of the burnt gases, which forms a characteristic feature of the cycle, is analogous, from a mechanical point of view, to "cushioning" in steam-engine practice. The power absorbed, it is claimed, is almost entirely restored; while the absence of shocks, the expulsion of the burnt gases, the large expansion obtained, and the simplicity of the arrangement, more than compensate for the slight loss of power due to the compression.

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**Coin-Freed Gas-Meters.**—Smith, G. B. & E. W., of Kennington Park Road, S.E. No. 6288; March 26, 1901.

This invention in prepayment gas-meters consists of mechanism combined with the usual meter-valve by means of a spur-wheel and rotating spindle.

There is first a loose shaft A (with two wheels attached to it) carried in one direction by the introduction of coins, and in an opposite direction by the consumption of gas. The shaft is carried round in one direction by means of a spindle B with worm thereon engaging with one of the wheels connected to the shaft by the coins inserted. This loose shaft also actuates the other wheel attached to it, which rotates around another wheel E of larger dimensions (placed at right angles to it) by means of a crown-wheel on the larger shaft and a spur-wheel on the smaller shaft, or *vice versâ*; the latter arrangement being preferable. Into this wheel of larger dimensions there engages also a worm (on a spindle driven by different sized crown-wheels, according to the quantity of gas required for each coin) actuated by the rotating spindle from the meter, which is connected, as already mentioned, to the revolving axle of the interior mechanism of the ordinary meter. It engages with its teeth, and carries the shaft and two wheels affixed bodily in the opposite direction—forming together an epicycle train of mechanism, and gradually closing the valve which the coin has opened. The movement of this train may be reversed, so that the spindle and worm driven by the coins may be driven by the consumption of gas, and the spindle driven by the consumption of gas may be driven by the coins.

The movement of the loose shaft and the two wheels connected to it rotating in one direction by the introduction of coins and in the other direction by the consumption of gas, opens and shuts respectively a valve by means of toothed gearing attached to the loose shaft and two wheels connected to it, which engages with the direct-operating shaft of the valve. The distance to which the loose shaft and two wheels affixed are carried, is determined by a drum or coin-carrier having a groove cut out in its periphery to receive a pawl, raised by the action of the coin so as to form a cam which forces the pawl above it; this action being caused by the rotation of the coin-receiver when a coin is inserted.

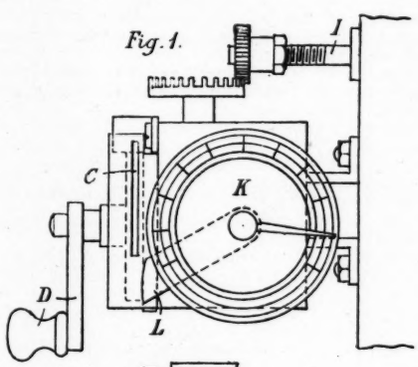
Around the remaining part of the periphery of the drum is cut a ratchet engaging with the pawl, so that the drum may be moved only in one direction—the pawl preventing any return movement until it has made a whole revolution, when, the coin having been discharged, the pawl again falls into the groove, and so fixes the drum until another coin is introduced, when a similar operation is gone through until a limited number of coins have been received. Then the direct-operating shaft of the valve carries a shield which covers over the coin-slit, and prevents the introduction of more coins (which would overstrain the mechanism) until there is sufficient space caused by the consumption of gas to allow the loose shaft and two wheels affixed to be moved.

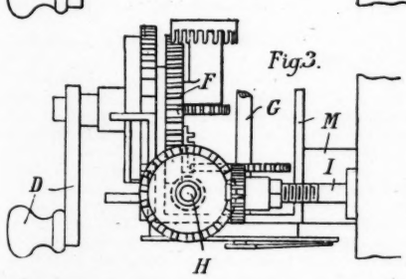
For adjusting the quantity of gas delivered for each coin, on the spindle driven by the consumption of gas a screw is formed, and a spur-wheel is screwed upon it with a lock or set-nut, so that it can be fixed anywhere along the spindle to allow for the varying sized interchangeable crown-wheels used for the varying prices of gas.

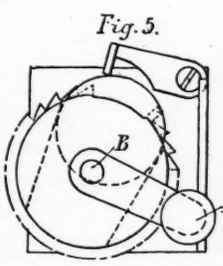
The result of this arrangement is that, on a coin being put through the slot, it passes into the drum or coin-receiver beneath. The external handle is then turned so as to rotate the drum or coin-receiver and carry with it the coin. This lifts the pawl, thereby setting in motion the other parts described, and opening the valve for the passage of gas to the meter. The coin then falls from the drum or coin-receiver into a suitable receptacle beneath.

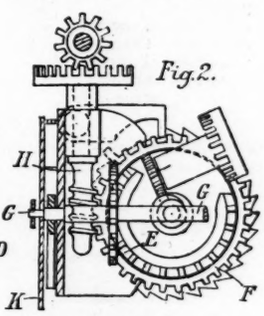
Fig. 1 is a front elevation of the entire mechanism. Fig. 2 is a side elevation partly in section. Fig. 3 is a plan. Fig. 4 shows a side elevation of the loose shaft with toothed wheels attached to it, and the crown-wheel operating the valve of the gas supply. Fig. 5 shows a side elevation (reverse of fig. 2) of the mechanism, with the coin lifting the pawl.

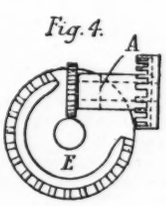
A is the loose shaft carrying (attached to it) the spur-wheel and crown-wheel. B is the spindle operated by the external handle D, and carrying a worm which engages with the spur-wheel. C is the slot for inserting the coin. E is a crown-wheel running loose on a spindle B, which conveys motion from the spur-wheel to the valve-spindle G. F is an intermediate wheel actuated by the worm which returns the epicycle train to the starting point by the action of the gas. H is a spindle carrying the worm and crown-wheel which engages with the spur-wheel. I is a shaft connecting the mechanism to the operating parts of the meter. K is the dial showing gas consumed. L is a shutter attached to the spindle of the dial which obstructs the coin-slot, when the stipulated number of coins has been inserted.



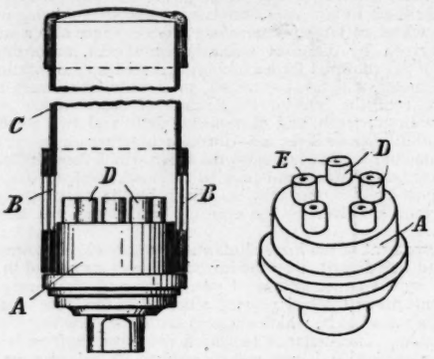

**Incandescent Gas-Burners.**—Boult, A. J.; a communication from the Société Lumière Boule, of Brussels. No. 8275; April 22, 1901.

This invention (relating to incandescent or bunsen gas-burners) consists in the arrangement of several nozzles or tips at the gas-exit at the lower part of the burner, "with the object of obtaining an intimate mixture of gas with the air."

The patentees remark that, in burners for incandescent gas lighting, as up to the present in use, a nozzle with a central passage is arranged in the lower part of the burner (or of the mixing-chamber or pipe), so that the gas leaving this opening draws in air through orifices in the mixing-tube, mixes the gas intimately with air, and leaves the top of the burner through a sieve or perforated plate, and burns with a blue flame. At the average pressure of the usual gas supply in houses, such a bunsen burner is sufficient for effecting an intimate mixture of the gas and air, as the gas-current passes through the burner-tube comparatively slowly—thus having sufficient time to mix with the air. A different action, however, takes place when gas under high pressure is used. In this case, the gas issuing from the nozzle into the burner-tube passes through the latter at such a high speed that a considerable amount of air is sucked into the tube without having time to intimately mix with the gas; the latter burning at the top of the burner in the centre of an air current with insufficient heat radiation.

The object of the present invention is to overcome this drawback, by making a burner in which the gas enters the mixing-chamber through several nozzles, so that, in spite of the high speed of the gas-current, an intimate mixture with the air is effected.

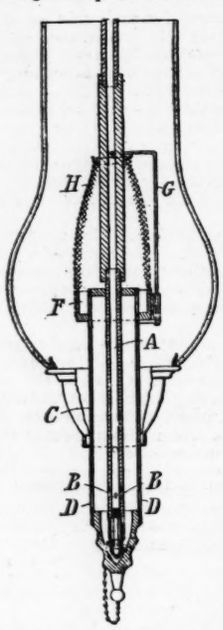
Such a burner is shown in side elevation with the mixing-chamber in vertical section; also a perspective view of the lower part of the burner with several gas-inlet nozzles.




The nozzle portion A is screwed on the gas-pipe, and serves to carry the tube or mixing-chamber C provided with air-inlet orifices B. The part A is at the upper portion provided with a series of nozzles D, with very small borings E. According to the dimensions of the burner, three or more nozzles can be arranged, five of which are shown in the engraving. Owing to this arrangement, the gas enters in several jets under a high speed into the tube C, and there becomes intimately mixed with the air drawn in through the opening B, so that the mixture at the upper end of the tube C burns with a blue heating flame, "developing the greatest possible heat."

**Incandescent Gas-Lamp.**—Niemann, C., of Berlin. No. 2508; Feb. 5, 1901.

This invention relates to an arrangement of hanging incandescent gas-lamps in which the gas-tube extends downwards and passes through the centre of the lamp as to act as its axis—that is to say, the lamp surrounds the lower end of the gas-pipe, which is carried vertically downwards without a bend, "so that the impression is created that the lamp is suspended by its upper end on the gas-pipe."

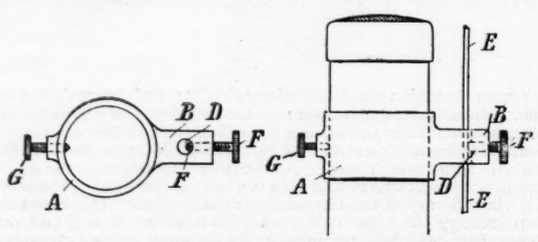



The gas-supply pipe A, which hangs downwards from the ceiling, is closed at the lower end, and provided with side-openings B for allowing gas to escape. A mixing-pipe C is arranged concentrically on the under-part of the gas-pipe, with air-holes D in its lower part. It carries at the top a burner-head F, on which (as usual) the support G for the mantle H is mounted. The gas-pipe passes through the centre of the mantle. The mixing-pipe carrying the burner-head and mantle is removably fixed on the gas-pipe, and on the outside of the mixing-pipe a gallery or support for the chimney or globe is fixed—preferably removably, by means of a bayonet-joint, for instance.

In order to open up the lamp to replace a mantle, the globe-support is first released from the mixing-pipe, and then, together with the globe and the chimney (if used), is drawn downwards away from the mixing-pipe. When a fresh mantle has been mounted over the burner-head, the whole of the burner is fitted upon the gas-pipe from beneath, and fastened thereto by means of a pin. Then the gallery or support with the globe resting on it is passed from beneath over the mixing-pipe, and fixed on the latter.

**Mantle-Supports for Incandescent Gas-Burners.**—Boult, A. J.; a communication from the Société Lumière Boule, of Brussels. No. 8281; April 22, 1901.

The patentees point out that, when using highly compressed gas, or gas under high pressure, it is important to position the mantle exactly concentrically to the burner-tube, so as to prevent the flame from affecting the light by acting on the mantle only on one side. The suggested device is represented in the engraving—a side elevation of the adjuster arranged on the burner-tube, and a plan of the adjusting ring.




For the purpose of raising or lowering the mantle, a ring A is arranged to slide upon the burner-tube C, and is provided with a lateral lug or projection B, in the vertical holes D of which the rod E, for carrying the mantle, is so fitted that it can be moved in a vertical direction, and be secured in any position by a set-screw F. The ring is arranged to move with slight friction in a vertical as well as a rotary horizontal direction, and can be fixed upon the burner tube in any desired position by means of a set-screw G.

## APPLICATIONS FOR LETTERS PATENT.

13,192.—Wright, W., "Heating or cooling apparatus for gas or other fluids." June 28.
13,197.—Compin, A. P., "Automatically incinerating incandescent light mantles." June 28.
13,222.—Stevens, J. H., "Liquid meters." June 28.
13,233.—Jeffreys, E. A., "Lighting and heating." June 28.
13,248.—Martindale, J. A., "Charging retorts." June 29.
13,302.—Naef, P., "Treatment of gases." June 29.
13,303.—Wise, W. L., "Acetylene lamps." A communication from E. von Szalay. June 29.
13,338.—Cooper, F. W., Foster, H., and Beresford, A., "Governors for gas-engines." July 1.
13,376.—Theisen, E., "Subdivision and vaporization of liquids." July 1.
13,384.—Scott, E. G., "Absorption of sulphuretted hydrogen evolved in the manufacture of sulphate of ammonia and coal gas." July 1.
13,439.—Bayles, A. G., "Controlling the flow of illuminating gas through the burner-tips." July 2.
13,450.—Yeadon, S. N., and Mason, W. D., "Revivifying gas lime." July 2.
13,460.—Mackean, W., and Walker, E., "Burning and seasoning incandescent mantles." July 2.
13,467.—Le Tall, F. W., "Fluid meters." A communication from H. Chrisman. July 2.
13,498.—Haddan, H. J., "Unloading coal from storage bins." A communication from the Brown Hoisting Machinery Company. July 2.
13,507.—Kitson, A., "Vapour-burning apparatus." July 2.
13,529.—Walker, C. W., "Treatment of gases from coal, coke, and other nitrogenous substances." July 3.
13,579.—Thompson, W. P., "Igniting devices for automatic gas lighting." A communication from A. Simonini. July 3.
13,594.—Hatcher, C., and O'Connor, H., "Purifying machine for gas and other fluids." July 4.
13,611.—Wright, J. W. B., and Darwin, H., "Gas-fires." July 4.
13,624.—Bushby, W. C., "Securing and sealing meters." July 4.
13,628.—Kew, H. E., "Sealing gas-retorts." July 4.
13,630.—Taylor, V. T., "Incandescent lighting apparatus." July 4.
13,651.—Rigaux, H., "Lighting device for gas-burners." July 4.
13,653.—Wood Smith, H., Gidden, W. T., Salamon, A. G., and Albright, G. S., "Treatment of coal gas for the manufacture of sulphocyanides." July 4.
13,680.—Wright, J. F., and Sutherland, A. G., "Coin-freed gas-meters." July 5.
13,690.—Gilgan, P., "Acetylene gas-generator." July 5.
13,717.—Simmance, J. F., and Wernham, W. G., "Heating or cooling gases." July 5.
13,731.—Leslie, Sir B., "Conveyors for coal." July 5.
13,746.—Whitfield, C., "Manufacture of combustible gas from soft or bituminous fuel." July 5.
13,759.—Smith, F., "Atmospheric gas-burners." July 6.
13,788.—Pregardien, J. E., "Purifying gas." July 6.
13,837.—Solomons, S., "Incandescent and other lighting." July 8.
13,852.—Lockerbie and Wilkinson, Ltd., and Brand, J. C., "Acetylene generators." July 8.
13,896.—Lange, W. M., "Cooling the cylinders of combustion motors." July 8.
13,918.—Clapham, W. S., "Purification of gases." July 9.
13,926.—Crossley, W. J., and Atkinson, J., "Internal combustion motors." July 9.
13,929.—Greenhalgh, C., and Clarke, W., "Preventing vibration in incandescent lighting apparatus." July 9.
13,983.—Whitfield, C., "Generation, purification, and storage of combustible gas." July 9.
13,996.—Evans, W. E., "Gas and oil engines." A communication from Heinle and Wegelin. July 9.
14,064.—De Mare, F., "Illuminating devices." July 10.
14,091.—Pataky, C., "Acetylene generators." July 10.
14,100.—Taylor, M., "Gas-producers." July 10.
14,117.—Parkinson and W. & B. Cowan, Ltd., and Cheshire, W., "Gas-cookers." July 11.
14,164.—Kay, J. S. G., Higgins, W., and Posener, A. M., "Combustible vapours for lighting and heating." July 11.
14,165.—Pohl, E., "Manufacture of coke." July 11.
14,168.—Chapman, E. F., "Carburettors." July 11.
14,183.—Taylor, M., "Gas-producers." July 11.
14,184.—Baker, H. E., "Generators for acetylene." July 11.
14,245.—Hunt, C. W., "Conveyors." July 12.
14,250.—Zehnpfund, K., "Bunsen burners." July 12.
14,263.—Fischer, A., "Valves for regenerative furnaces." July 12.
14,310.—Shaw, E. J., "Brackets for incandescent gas-burners." July 13.
14,342.—Kitson, A., "Vapour-burning apparatus." July 13.

Scraping the water-main at Workington has had a decidedly beneficial effect on the water supply—the increase per day being something like 80,000 gallons. In July last year, the main delivered 527,000 gallons; the average for the present month is 607,000 gallons.

# CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

## Welsbach's Belgian Patents.

SIR,—Allow me to state that Messrs. Faithfull and Owen's opinion on the validity of the Auer patents in Belgium is altogether wrong. Dr Auer's first patent in Belgium, dated November, 1885, was taken out when the invention was yet protected in Austria by a patent dated September of the same year. Therefore this patent was what our law calls a "*brevet d'importation*;" and such patents only last for a number of years equal to the legal duration of the foreign mother patent in its native country. Austrian patents having a legal duration of only fifteen years, the Belgian patent of 1885 has expired. There is to my knowledge no dispute on that point in our land.

With regard to the subsequent patents—those of 1886 covering the thorium mantle and of 1892 covering the thorium-cerium mantle—they are decided to have been only what we call here "*des brevets de perfectionnement*," patents for improvements or additional ones. Such patents, says the law, shall expire with the master patent.

Thus it is that your correspondent was right when he mentioned that the Auer Company's monopoly was at an end, at least for the present, and so long as the Cour d'Appel shall not have corrected the judgment given by the Brussels tribunal, of which your readers had a very good translation.

*Brussels, July* 18, 1901. A BELGIAN "DOCTEUR EN DROIT."

## Ammoniacal Liquor as an Insecticide.

SIR,—There is nothing new in the "discovery" by a Continental chemist, referred to in a "Note" in yesterday's "JOURNAL," of the value of ammoniacal liquor as a destroyer of insect pests on vegetation. More than thirty years ago my father, who was an enthusiastic gardener in his leisure hours, used a spray of ammoniacal liquor very successfully for this purpose; and I have a lively recollection of hours spent with a bucket and syringe upon a bed of badly blighted carrots, which afterwards yielded a handsome crop in return for the none too pleasant labour expended in extirpating the enemy.

*Chester, July* 17, 1901. JNO. C. BELTON.

## Air Jacketing Gas-Producers.

SIR,—The air jacketing of gas-producers adopted by Messrs. Crossley Bros. will certainly tend to prevent the shell of the producer from becoming overheated, and it will secure heat economy as well. The arrangement referred to in the last "JOURNAL" (p. 142) is, however, old, as a reference to the pages of a well-written book by Sexton, on "Fuel," shows. The author illustrates one of the Thwaites producers, the "Simplex," with such a jacket.

*July* 18, 1901. CLINKER.

## Twelve and Fourteen Candle Power Gas.

SIR,—If your correspondent, "Retort Lid," will refer to the "JOURNAL" for July 19, and March 15, 1892, he will find articles by Mr. B. H. Thwaite on the subject he is interested in. He will also find articles by Professor Lewes on the same subject in the same year.

*Brixton, July* 19, 1901. D. H. DYSON.

**The First Automatic Conveyor.**—Mr. George Tangye writes, in reference to the paragraph on this subject which appeared last week (p. 142): "I am much interested in the discovery that Mr. William Murdoch, the inventor of gas, made the first automatic conveyor at the Soho Works, Smethwick, in 1788, and I shall have much pleasure in placing Mr. Little's communication among the Boulton and Watt and Murdoch relics. I have always regretted that illuminating gas was not first called 'Murdoch,' and that it does not at the present time go by this name. Murdoch and my grandfather lived very near each other for many years in Cornwall. My grandfather was a Hornblower man, and consequently, no doubt, did his best to turn Boulton, Watt, and Murdoch out of Cornwall, which would have been a calamity for everybody."

**Manchester Gas Supply.**—At the meeting of the Gas Committee of the Manchester Corporation last Friday, an abstract of the accounts of the Gas Department for the year ending March 31 last was submitted and adopted. The quantity of gas transmitted from the works showed an increase of 7,981,000 cubic feet, or 0·17 per cent., compared with an increase of 268,771,000 cubic feet, or 6·03 per cent. in the previous year. During the past three years the increase in the consumption of gas has averaged 193,435,000 cubic feet, or 4·66 per cent. The price of gas was raised by 3d. per 1000 cubic feet from and after June 24, 1900. This advance added £40,594 to the income of the department, but retarded the increase in the consumption by 6 per cent. The total amount of revenue was £724,463, compared with £654,527 in 1899-1900; being an increase of £69,936. The amount paid for coal, cannel, and oil, including the cost of unloading, was £318,568. The cost of material per ton carbonized was 13s. 10·28d., against 11s. 0·54d. for the previous year—an increase of 2s. 9·74d. per ton, which on the total carbonization of 459,811 tons amounts to £64,642. The gross profit on the year's working was £130,405 4s. 10d. The sum of £40,233 15s. 11d. was paid for interest, and £37,421 15s. 8d. has been placed to the sinking fund. The net profit, therefore, amounted to £52,749 13s. 3d. Of this sum, £51,900 was paid over to the city fund, and the balance of £849 13s. 3d. has been applied in the extension of the carburetted water-gas plant.

# PARLIAMENTARY INTELLIGENCE.

## GLEANINGS FROM THE COMMITTEE ROOMS.

It is expected that the present session of Parliament will be prorogued about Saturday, Aug. 17; and, as a Bank Holiday intervenes, there is really little time for further work. There is every appearance, however, that the Private Bill legislation will be completed well within the time. Early last week, Lord Hatherton's Committee devoted some hours to the consideration of the clauses of the Mond Gas Bill; and several amendments were discussed, which readers in the area covered by the Bill will find most interesting. The preambles of the Leeds, Harrogate, and Stockport Water Bills have been proved a second time.

**A Meddlesome Council Ordered to Pay Costs.** The West Riding County Council are a contentious body; and they always appear to be intermeddling in other people's affairs. Whether they aspire to emulate the London County Council we do not know; but, like that body, they are alive to any opportunity of causing worry to other public bodies within their area. Session after session, we have noticed that they have had their fingers in somebody's pie; and session after session we have also noticed that, if they have not actually burnt their fingers, they have got little or nothing from their vexatious proceedings. There is a good illustration this session. The Leeds Corporation Water Bill, as already announced in the Gleanings, went through the Lords Committee to which it was first referred; both the promoters and the opponents adopting throughout a very conciliatory attitude towards each other. Wise overtures, here and there, overcame all difficulties; and it was anticipated that the remaining stages of the Bill would be peacefully passed through. But on the Bill entering the second House, up popped the West Riding County Council, and petitioned that they should have power to make sure that the Corporation sent down the proper amount of compensation water, and power to inspect the gauges. The promoters naturally contended when the Bill came before Sir F. Godson's Committee last Thursday, that, as the County Council did not oppose in the other House, they had no right to appear in this one. Mr. W. L. Jackson, M.P., supported this contention; believing that there was no justification for the County Council setting up the claims mentioned. All Mr. Baggallay's pleading, in his most agreeable manner, failed to convince the Committee that the Council had any ground for opposition; and they found the preamble proved. The Committee emphasized their decision by granting an application for costs against the Council; allowing the round sum of 250 guineas. A rebuff or two of this kind will, it is to be hoped, tone down the ardour of this officious body.

**A Remote Contingency.** When the Leeds, Harrogate, and Ripon water schemes were before the Lords, the three authorities came to a friendly arrangement regarding the Burn watershed, in which they had all planted their projects. The Harrogate proposals involve the construction of a reservoir at Roundhill, which will be at a higher level than the Leeds works. Since the Bills were previously under consideration, it has occurred to someone that, in the event of an earthquake or landslip, the Harrogate reservoir may burst, and do damage to the Leeds works. Leeds therefore came before Sir Frederick Godson's Committee, and asked for the insertion of a clause in the Harrogate Bill throwing upon them the responsibility of any damage caused. The answer of Harrogate was that both Corporations went to the Valley of the Burn with equal rights; and therefore they ought to take equal risk. The Committee were not satisfied that the clause should be put in; and they found the preamble proved. Therefore both the Leeds and Harrogate Bills go forward in the condition in which they left the Lords.

**Protecting the Weak.** The same Committee dealt with the Stockport Corporation Water Bill, which, like the two preceding measures, has already been through the Lords. Its proposals were noticed at the time, so that it is unnecessary to mention them beyond saying generally that it is the intention of the Corporation to obtain an additional supply of water from the Kinderscourt district. The only opponents before the Lower House were the Hayfield Rural District Council; and they secured satisfactory recompense for the expense incurred in their appearance at Westminster. The Committee decided that a clause is to be inserted, providing that the present supply to Little Hayfield shall be replaced by the Corporation free of cost if and whenever it is interfered with. A proviso was also inserted to the effect that, when the Corporation construct the Kinder works, the water supplied to Hayfield shall be at a price not exceeding 4½d. per 1000 gallons. In the meantime, nothing in the Act is to prevent the Hayfield Council from supplying their district with water from the Coldwell Springs, and such of the works as are rendered useless when the Corporation undertake the supply of Hayfield, are to be purchased at a price not exceeding £1000.

**Broadstairs Water.** The Broadstairs Water and Improvement Bill came before the Deputy Chairman of Committees as an unopposed measure last Thursday; Mr. J. W. Lowther being absent through illness. The Engineer of the Bill was Mr. William A. M'Intosh Valon, who, with the Chairman, and Clerk to the Council (Mr. L. A. Skinner), was present to represent them. The Bill was introduced to the Committee by Mr. Lees (of Messrs. Baker, Lees, and Co., Parliamentary Agents), who explained its object as to the purchase of the water concern from the Company by agreement, as well as asking for sanction to various matters in connection with the regulation of the foreshore, &c. Mr. Valon gave evidence as to the water portion of the Bill, and the Chairman of the Council and Mr. Skinner with reference to the remaining matters. After a hearing extending over a considerable time, the Bill passed through Committee without any important alteration.

## HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills reported, with amendments: Blackburn Corporation Bill, Golborne Gas Bill, Mond Gas Bill, Wells Corporation Water Bill.

Bills read the third time and passed: Bingley Urban District Council Bill, Burton-upon-Trent Corporation Bill, Edinburgh and District Water Order Confirmation Bill, Kingston-upon-Hull Corporation Bill, Long Eaton Gas Bill, Metropolitan Water Companies (Amendment of Acts) Bill, South Metropolitan Gas Bill, Swanage Gas and Water Bill.

## HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Lords Bill reported, without amendment: Dover Gas Bill.

Lords Bills reported, with amendments: Broadstairs and St. Peter's Water and Improvement Bill, Elland Gas Bill, Harrogate Water Bill, Heywood and Middleton Water Board Bill, Leeds Corporation Water Bill, Newport (Isle of Wight) Gas Bill, South Essex Water Bill, Stockport Corporation Water Bill.

Lords Bills read the third time and passed: Handsworth Urban District Council Bill, Sheffield Corporation Bill, Wisbech Water Bill.

## HOUSE OF LORDS COMMITTEE.

**Monday, July 15.**

(*Before Lord* HATHERTON, *Chairman*, *Lord* CROFTON, *Earl* CRAVEN, *Lord* ARDILAUN, *and Lord* ST. OSWALD.)

### MOND GAS BILL.

Mr. TAHOURDIN said that since the sitting on Friday, his clients had considered the decision, and had resolved to leave themselves in the hands of the Committee. They did not propose to trouble their Lordships with Counsel; but they asked them to carefully consider the fact that the proviso in the Bill was inserted for the protection of the Gas Companies, and the way in which the decision given would affect them. It did not necessarily follow from the difference in price that the ordinary Gas Companies charged more for gas for power than the Mond Company; because, as Sir F. Bramwell said, the cost of distribution and collection with smaller consumers would be greater than with the large ones, and therefore the smaller consumers might not receive Mond gas at anything like the same price as the larger ones. Further, four times as much Mond gas was required as of ordinary gas; so that the cost of Mond gas, which was roundly given as 2d. per 1000 cubic feet, had to be multiplied by four, at least. Having regard to these things, it was quite probable that the Gas Companies could supply the smaller consumers at as low a price as the Mond Company. The Local Authorities and consumers had no objection to the proviso in the Bill as originally inserted; and they asked the Committee to reconsider their decision, and allow the proviso to remain as it stood originally.

Mr. WEDDERBURN pointed out that the clauses of the Bill generally had practically not been criticized, owing to the withdrawal of the opponents after the decision in the House of Commons. As regards the particular matter now under discussion, Walsall desired to obtain for their ratepayers, who might be small consumers, as much protection as they could. They asked that they should be in a stronger position than the decision of the Committee placed them; and therefore they wished it to be made compulsory on the Company to supply anybody who would enter into a written contract with them to take a supply without limit as to the amount or time. It was most unusual, if not unprecedented, for a company having power to supply a certain article to say they would do so only to certain consumers. What he proposed could be effected by omitting certain sections of the Bill; but if the Committee thought his contention should be made applicable to Walsall alone, it could easily be done by a separate clause.

Mr. WALLACE pointed out that in the House of Commons the contention of the Gas Companies and of the Local Authorities authorized to supply gas was that the Mond Company should be limited to supplying only customers who required more than a million cubic feet.

Mr. WEDDERBURN remarked that Walsall never pressed that.

Mr. WALLACE (continuing) said the Company had given that undertaking; so that he thought Mr. Tahourdin's contention fair. Mond gas was not a commodity which was to be supplied, as Mr. Wedderburn seemed to think, for domestic purposes. A million cubic feet of Mond gas was in reality a small amount, because it represented practically a payment of only £32 per annum. This was not a commodity which competed with gas, but one which competed with coal; and £32 worth of coal per annum was a small amount. Therefore he thought the alteration made by the Committee would do an injustice to those who, in the House of Commons, agreed to the limit there inserted in the Bill.

Mr. WEDDERBURN said in the other House Walsall contended for total exclusion, and opposed the Bill. No witness from the town was called to support the measure. In this House, various persons had been called; but they had given their support in the belief that the small consumers would be supplied.

Mr. WALLACE pointed out that the small consumers were supplied by the Bill. A 6-horse power engine was a small consumer; and this would be supplied under the Bill as it left the Commons.

Mr. WEDDERBURN said the whole thing would be met if the clause obliging the Company to supply gas were read as if the words "not less than 1 million cubic feet per 13 weeks" were omitted.

Mr. COOPER (Parliamentary Agent representing the authorities of West Bromwich, Smethwick, Tipton, Oldbury, and Sedgley) said that, on the faith of the agreement referred to being in the Bill, his clients were only appearing on clauses. They would certainly have appeared on preamble if the provision which the Committee had altered had been omitted. He had no objection to what Mr. Wedderburn contended for as being desirable for Walsall, if it did not affect other places. He asked the Committee to retain the clause as it was in the Bill.

The CHAIRMAN, after further discussion, said: The Committee have concluded to strike out the amendment that has been proposed—that is, to leave the latter part of clause 34 as it originally stood; and the Committee cannot make any provision in favour of one place as compared with another. In order that there may be no mistake, perhaps I had better read clause 34 as it will now stand: "Provided, further, that the Company shall not supply any person with gas unless such person is willing to contract for a supply of not less than 1 million cubic feet a year; nor shall the Company supply gas for use in private dwelling-houses."

Mr. WEDDERBURN, to carry out the decision of the Committee that if the Company did not come into Walsall within four years their powers should cease, proposed the following clause: "(44A.) If within four years from the first day of January, 1902, the Company have not laid down distributing mains in the borough of Walsall for a distance of not less than 3 miles from the south-western boundary of the borough, and are not in a position to afford therefrom such a supply of producer gas as may be required in the borough, the powers of the Company under this Act within the said borough and the Walsall Rural District Council shall cease." The 3-mile limit was inserted in order that those who desired to take the gas should be able to do so.

Mr. WALLACE remarked that the objection was that there was nothing definite as to what the requirements of the borough of Walsall might be. The word "requirements" was very vague. If the clause was altered so that the Company were not required to lay mains to give a supply, unless persons or firms entered into a contract to take the gas, he would accept it. The words "not less than" should also be struck out, and words inserted to the effect that the distance should not exceed 3 miles from the generating station to be erected on land described in the schedule. The clause also should only apply to the borough of Walsall, and not to the Walsall rural district.

Mr. WEDDERBURN could not agree to any of the alterations proposed. If the provision as to not exceeding 3 miles were inserted, for the purpose of the Company a quarter-of-a-mile would do.

Mr. WALLACE said if anyone demanded a supply within the 3-mile limit, he could obtain it. But if all the people who wanted the gas were within 1 mile, it would be absurd for the Company to lay 2 miles of mains. As he (Mr. Wallace) proposed, the distance would only be 3 miles if there were consumers desiring the gas in all that area.

Mr. WEDDERBURN said that would not do, because, under section 34, a consumer could only demand a supply if within 100 yards of the main. It was necessary, therefore, that the main should run a long way into the borough. If they came in for (say) a quarter-of-a-mile, there might be only one customer within 100 yards. Then the promoters, in their amendment, said: "Such a supply of gas may be required." He quite agreed that there might be some question as to whether they had met the requirements of the borough; and therefore he was willing to add that there should be an arbitration to the Board of Trade to say whether there were requirements or not. But he could not consent to a provision as to such a supply of gas as might be required by persons or firms entering into a definite contract for supply. On behalf of Walsall, he desired that the Company should supply large and small consumers alike. The suggested alteration would limit the supply to be given to persons who had entered into a contract. Then as to the Walsall rural district, he understood the decision of the Committee was to apply to the borough of Walsall and the Walsall rural district, because the Corporation were the Gas Authority for both.

Mr. WALLACE pointed out that the Committee distinctly said they did not deal with the rural district of Walsall at all. It was not right to argue the matter after it had been decided. If the Company were acting unfairly in regard to the supply, they were quite willing it should come before the Board of Trade; but it would be manifestly improper to compel the Company to lay mains where the commodity was not wanted. In the clause which he (Mr. Wallace) suggested, anyone who entered into a contract would get a supply. If the person did not enter into a contract, the Company would not be bound to supply.

Mr. WEDDERBURN understood that the Committee did not differentiate the Walsall rural district and the Walsall borough in any way. He asked the Committee not to hang him up, either as a borough or as a gas authority. If the Company, within a given time, did not come into the borough or rural district, their powers should cease.

A NOBLE LORD: How far is the proposed generating station from the boundary of the borough?

Mr. WALLACE: About 3 miles.

The CHAIRMAN: The Committee want to be quite clear on the point that, if the Company fail to complete their agreement with the borough, then the Walsall rural district comes out—that is to say, the borough and rural district are to be treated as one.

Mr. WEDDERBURN: That is my point.

The CHAIRMAN: The Committee will accept clause 44A.

In the course of further conversation, the Committee intimated that there was to be an arbitration clause.

Counsel for Walsall then brought up several clauses for insertion in the Bill.

Mr. BALFOUR BROWNE said one of the proposals was that the Walsall Corporation should have power to purchase the Company's works in Walsall. There was nothing of the kind in the Bill; and the Company had never contemplated anything of the sort.

Mr. WEDDERBURN remarked that the matter was distinctly raised in the petition; and it was a very common power to give local authorities. He pointed out that in the House of Commons, on the passing of the preamble, all the opposing Local Authorities withdrew. They declined to go into clauses; and consequently the clauses of the Bill had not been criticized.

Mr. BALFOUR BROWNE said such an important point as purchase surely ought to have been raised on preamble. It was too big a matter to discuss now. It went to the vital principles of the Bill.

After discussion, further consideration of the clauses was adjourned, to allow Counsel for the Company to consider them.

**Tuesday, July 16.**

Mr. BAGGALLAY said that, since the previous meeting of the Committee, he had had an opportunity of looking through the sheaf of clauses brought up by Walsall; and he submitted that some of the points dealt with were distinctly preamble matters, which could not properly be raised at this stage of the proceedings. As a whole, the clauses were a distinct attempt to get behind the Committee's decision, and to make it impossible for the promoters to go into Walsall or to do any work there. One group of clauses proposed to impose the auction clauses with regard to the raising of all the capital of the Company excepting the first £100,000. Such a thing as applying the auction clauses to original capital was, he believed, absolutely without precedent. These clauses were applied only to additional capital raised by going concerns. The proposal would not only affect Walsall, but the whole scheme of the Bill. All the other districts were satisfied that the Company should have power to raise capital in the ordinary way, and that they should not be put under the auction clauses. It would be practically impossible to obtain original capital in that way. The matter, if raised at all, ought to have been raised on preamble. Then the Corporation proposed a new clause, numbered 30A; and to sub-clause (8) he took the strongest objection. The main provision of this sub-clause was as follows:—

The Corporation may, within six months after the expiration of a period of twenty-one years from the date of the passing of this Act, and within six months after the expiration of every subsequent period of seven years, by notice in writing, require the Company to sell, and thereupon the Company shall sell to them, so much of their undertaking as is within the said borough, upon terms of paying the then value of all lands, buildings, works, materials, and plant of the Company suitable to, and used by them for, the purposes of their undertaking within the said borough, such value to be, in case of difference, determined by arbitration: Provided that the value of such lands, buildings, works, materials, and plant shall be deemed to be their fair market value at the time of the purchase; due regard being had to the nature and then condition of such buildings, works, materials, and plant, and to the state of repair thereof, and to the circumstance that they are in such a position as to be ready for immediate working, and to the suitability of the same to the purposes of the undertaking, and to any loss occasioned by severance; but without any addition in respect of compulsory purchase or of goodwill, or of any profits which may or might have been or be made from the undertaking, or of any similar considerations.

Following on that, it was provided that if there was any difference between the Corporation and the Company touching anything to be done or not done under section 30A, such difference should be settled by an arbitrator appointed by the Board of Trade. Sub-clause (8) was not a clause matter, but one for consideration on preamble. No such clause had ever yet been inserted in a Private Bill authorizing an original undertaking. By general legislation, in the case of public electric lighting undertakings and tramways, provision had been made for purchase under certain provisions at the end of a certain period; and in some cases Parliament decided the question of purchase of an existing undertaking on the application of a local authority. But Parliament had never dealt with the matter in the way now suggested. Counsel quoted at length from the report of the Joint Committee presided over by Lord Cross, and submitted that the general principle laid down there was that, save in some very exceptional cases, a purchase clause should not be inserted in these Power Bills, but that in certain circumstances local authorities should have power to go to the Board of Trade to have the right of purchase reserved to them on showing good cause. The provision here proposed—that at the end of 21 years their undertaking should be purchased, without regard for goodwill or the profits they might have been earning—would make it impossible for the Company to raise capital to carry on the undertaking, not only in Walsall, but in any other part of the area. Then the Corporation proposed the following clause (35B):—

(1) If within three years from the first day of January, 1902, the Mayor, Aldermen, and Burgesses of the borough of Walsall (in this section referred to as "the Corporation")
(*a*) shall have obtained power to distribute gas supplied by the Company, and
(*b*) shall have served notice upon the Company requiring them to supply gas to them in bulk, and
(*c*) shall enter, or be prepared to enter, into a contract with the Company to continue to receive and pay for such a supply of gas as may be required for consumers within the said borough for a period of at least seven years—
the Company shall not at any time thereafter supply gas within the borough of Walsall except to, or with the consent of, the Corporation, and shall supply to the Corporation such quantity of gas as may be required for consumers within the said borough at a price to be agreed, or, in default of agreement, to be determined by the Board of Trade.
(2) The Company shall not oppose any application made by the Corporation within the said three years for power to distribute gas supplied by the Company.

The effect of this would be that for three years the Company could do nothing, because the Corporation were taking this time within which to go to Parliament for power to distribute Mond gas, and to call on the Company to supply in bulk. During that time, the Company could not lay a main; yet if they did not supply within another year—four years—their (the Company's) powers would cease. This was a deliberate and exceedingly bold attempt to go behind the Committee's decision of the previous Friday, and to obtain for the Corporation of Walsall the right to compel the Company to supply them in bulk. Another amendment proposed by the Corporation was to substitute for 125 B.T.U. provided for in the Bill, 150 B.T.U. This would go to the very root of the cost of carrying on the undertaking; and it ought to have been dealt with by evidence on preamble. Next they proposed to reduce the dividend on the original capital from a maximum of 10 per cent. to a maximum of 6 per cent. Such a thing, at all events in recent years, was quite unheard of. There was no gas or water company—certainly of late years—who, under the General Acts, had not a 10 per cent. maximum for the original capital. Six per cent. was the maximum allowed for preference capital, and 7 per cent. for ordinary capital, when that capital was additional. The alteration now proposed would affect the whole power of the Company to raise capital, and the probability of the success or failure of the undertaking. This also ought to have been gone into on preamble. The object of the clauses generally was to render it impossible for the Company to do business in Walsall, unless they were willing to supply the Corporation in bulk. There were a number of other small matters which he agreed should properly be discussed on clauses.

Mr. WEDDERBURN said the object of the clauses was not to evade, but to carry out, the decision of the Committee. They had been told that certain things were unprecedented; but legislation of the character now proposed—Mond gas itself—was more or less unprecedented. Mond gas was a motive power, to some extent in the nature of electricity; but it had not yet become popular, and it had not yet, like electricity, become the subject of legislation. Therefore, of necessity, in seeking protection, he was bound to ask for certain things which, because of the peculiar position of the Bill and of the article with which it dealt, were, and must be, unprecedented. The clause with regard to the supply in bulk was specially designed to enable the Committee to do what they said they desired to do. He had given perfectly clear notice of his intention to bring up the clause. In giving their decision, the Committee said there should be a limit of time, and some protection for small consumers. The previous day, owing to the action of the Gas Companies, the Committee did not feel themselves able to differentiate Walsall, or to alter the clause as it originally stood in the Bill. The protection of the small consumer made it important for him to have this clause. Under the Bill as it stood now, if the Company alone supplied they could not supply the small consumer—that was, anyone who did not take more than 1 million cubic feet. If, however, the Committee gave the bulk clause he asked for, the Corporation would not be bound in a similar way, but would be able to distribute to every consumer in Walsall as they thought fit. In this way—namely, by giving protection to the small consumer—the clause would enable the Corporation to do that which the Committee had said they desired should be done. Walsall was differentiated from other towns because, whereas in other places the question of the small consumer had not arisen, in this instance there were a large number. Further, Walsall being on the edge of the district, a supply in bulk could be given there without affecting the rest of the area.

The CHAIRMAN (after consulting with his colleagues) said: The Committee made an endeavour to protect the smaller consumers by inserting certain words.

Mr. WEDDERBURN: I understand those words were cut out yesterday.

The CHAIRMAN: But this attempt to protect the small consumers was vigorously opposed on the part of the Gas Companies; and the Committee gave way on the point, and struck the words out. The Committee must stand by that.

Clause 35B was accordingly rejected.

Mr. WEDDERBURN (continuing) said that, with regard to the purchase clauses, there was no decision by Lord Cross's Committee that there was to be no purchase. The Corporation proposed that, as the Company were coming into their area, they should have the right after a certain time to purchase the concern in their district. This was a right which was given by the general law, under the Electric and Tramways Acts; and, in order to avoid having to come hereafter with a Mond Gas Transfer Bill, the Corporation asked that the purchase clause should be inserted now. Why was Mond gas to be excepted from the general rule that, where a company undertook to supply a district with such a commodity as this, and had had a fair run for their capital, the local authority should be allowed to purchase the concern? As to the auction clauses, he agreed that they had been held to apply, as a rule, only to additional capital. But here the circumstances were exceptional. The capital powers sought were £1,000,000, with borrowing powers of one-third more; but all that could be called original capital (as was shown by clause 10 of the Bill), was a much smaller sum. The reason the auction clauses had been held not to apply to original capital was that it was agreed that a company ought to be able to start. After that the capital should be issued by auction; the premiums received inuring to the benefit of the public. Why should the premium in this case go into the pockets of the shareholders? He asked the Committee to say how much of the capital could be called original; and, having done this, to apply the auction clauses to the balance. The auction clauses ought not to be got rid of by the expedient of asking for an immense capital. With regard to the British thermal units, he asked for the alteration from 125 to 150, because they gave the latter figure as being the average value of the gas; and the high or low quality of the gas made a difference to the consumer. As to the dividend, he submitted there was no reason why they should have 10 per cent. The model clauses gave 7 per cent.

Mr. BAGGALLAY: Not for original capital. The 7 per cent. for ordinary and 6 per cent. for preference are in relation to additional capital.

Mr. WEDDERBURN said it certainly was at one time common to give 10 per cent.; but money had become much cheaper, and circumstances had changed. He submitted, therefore, that there was no real reason why the Company should require 10 per cent., and should not be content with something smaller.

Mr. BAGGALLAY, in replying to Mr. Wedderburn's contentions, said that, when electric light undertakings were first started, a purchase clause was inserted; but this was found to so hamper them, that Parliament subsequently doubled the period—making it 42 years. This was done, however, by general legislation in both cases. No provisions for the purchase of tramways or electric lighting concerns would be found in Private Bills. The report of Lord Cross's Committee practically meant that the purchase provisions applicable to electric light undertakings were not necessarily applicable to power concerns. The supply of Mond gas was in exactly the same position as electrical energy furnished for power. The report of the Committee distinctly discouraged putting in a purchase clause, unless there was some very exceptional reason. With regard to the auction clauses, Mr. Wedderburn said the promoters were raising excessive capital. He did not, however, suggest this on preamble as a reason for cutting down the amount. Counsel submitted, in conclusion, that the Committee should not now allow the subject of the purchase clauses, the auction clauses, the British thermal units, and the dividends to be re-opened.

The CHAIRMAN (after consultation): The Committee are entirely in your favour, Mr. Baggallay.

The Committee then proceeded to consider some matters which Mr. Baggallay agreed ought properly to be discussed on clauses.

Mr. WILLIAMS proposed to amend the second clause of the Bill by inserting a provision prohibiting the conversion of borrowed money into capital. He said that under the Bill as it stood, the Company having raised money by borrowing on mortgage or by debentures, might, when the time for repayment arrived, instead of re-borrowing on mortgage at a low rate of interest, raise new capital at a very much higher rate. If the Company met with the success that was anticipated, their share capital would pay 10 per cent.; while money could be raised by loan at a little under 3 per cent. The consumers were entitled to have their gas at as low a price as possible; and they would not get it at a low price if the Company were allowed to convert borrowed money into share capital.

Mr. BAGGALLAY said there was a most extraordinary misconception in the minds of many people as to the power to convert borrowed money into share capital. Persons in the present day had lost sight of the real origin of the provisions of the law respecting the restrictions of the amount of money to be borrowed and the conversion of borrowed money into capital. The original idea was that all undertakings should be carried on at the risk of the shareholders, if there was a risk; and for the benefit of the shareholders, if there was a profit. Companies, however, often found that they could borrow money more cheaply than they could raise it as share capital, particularly when they had obtained a certain proportion of the share capital, and had got their works more or less into swing. But Parliament was always careful to restrict the amount that might be borrowed. He did not himself remember any such restriction having been put into a Bill with regard to original capital as that which was now proposed; and he did not think it would be right to adopt such a restriction in the present case. The best interests of the public would be served by letting the shareholders take all the risks, instead of by having the undertaking heavily mortgaged —especially as at some future time the Local Authorities might come forward with a purchase scheme.

The Committee decided to insert the amendment.

Mr. WILLIAMS proposed the omission from the Bill of the clause incorporating section 132 of the Companies Clauses Consolidation Act. He said that, under clause 38 of the Bill, after a dividend of 10 per cent. had been paid, one-half of the surplus might be applied to form a reserve fund, and the other half to reduce the price of gas to the consumers. Section 132 of the Companies' Clauses Act said that, before apportioning the profits, the directors might set aside such sum as they thought fit, to meet contingencies, or to enlarge, repair, or improve the works connected with the undertaking. If this section were incorporated, the Company would be able to provide any money they liked towards enlarging their works before they declared what was the excess of profits. The result might be that the consumers would never have the price of gas reduced to any reasonable extent, but have to go on paying 3d. or 4d. per 1000 cubic feet, instead of the 2d. put forward by the promoters.

Mr. BAGGALLAY asked whether there was any precedent for the proposal.

Mr. WILLIAMS said that personally he knew of none; but his experience was limited.

Mr. BAGGALLAY said that the clause which the Committee were asked to strike out had been incorporated in every Gas and Water Act; and there was no reason for making an exception in this case.

The Committee declined to omit the clause.

Mr. WILLIAMS then brought up a clause for the protection of the roads and bridges of Walsall, and a discussion arose on the points of detail involved.

Eventually it was decided that a schedule should be inserted in the Bill mentioning the roads which were to be protected.

Mr. WILLIAMS next asked that power should be given to the Board of Trade to revise and reduce the maximum charges of the Company for the supply of power gas to their consumers. Under the Gas-Works Clauses Acts, he said, power was given to any two consumers or ratepayers to memorialize Quarter Sessions to appoint an impartial person to go into the gas accounts and report whether any, and, if any, what, reduction should be made in the price of gas. There was no such provision in the Bill. Practically, the Company would have a monopoly in the district; and there would be nothing to compel them to reduce their charges. He asked that the Board of Trade should be substituted for Quarter Sessions; and that they should have power to employ an engineer of experience to go into the question.

Mr. BAGGALLAY said he had no objection to the proposed clause, which the Committee thereupon accepted.

Some discussion took place in private between Counsel as to the amount of the reserve fund; and, as a result, Mr. Baggallay announced that it had been agreed to reduce it from £200,000 to £100,000.

The remaining clauses were afterwards adopted; and the Bill was ordered to be reported.

## HOUSE OF LORDS COMMITTEE.

### Wednesday, July 10.

(*Before Lord* HATHERTON, *Chairman, Lord* CROFTON, *Earl* CRAVEN, *Lord* ARDILAUN, *and Lord* ST. OSWALD.)

GOLBORNE GAS BILL.

The Bill promoted by the Golborne Gas Company for incorporation with statutory powers (the proceedings on which, when before the House of Commons Committee, were reported in the "JOURNAL" for May 28 last), came to-day before the above-named Committee of the House of Lords.

Mr. RAM, K.C., and Mr. HONORATUS LLOYD appeared for the promoters; Mr. WEDDERBURN, K.C., and Mr. DAVIS WILLIAMS represented the Leigh Corporation.

Mr. RAM, in opening, said the object of the Bill was to incorporate the Golborne Gas Company, Limited, to repeal the power of the Leigh Corporation to supply gas within the area of Golborne, and to increase the capital of the Company by £15,000. The gas undertaking was started in 1855, by a man named Lawson. The Leigh Gas Company obtained statutory powers in 1861 to supply their district, including Golborne; and Mr. Lawson, not being a rich man, allowed the Bill to pass unopposed. In 1867, the Golborne Gas Company was formed; and the Company had from that time supplied gas without complaint, and without the slightest interference on the part of Leigh. In 1874, the Leigh undertaking was, by statutory power, purchased by the three Local Boards of West Leigh, Pennington, and Bedford, who, in the next year, became the Leigh Urban Sanitary Authority. In 1876, the Gas Committee of the newly-formed body considered the question whether or not they should supply gas to Golborne, and decided not to do so. Upon that, the Golborne Gas Company said they must increase the capacity of their works; and this actually took place. So agreeable were the Leigh people to Golborne supplying itself, that they lent their Engineer, Mr. Joseph Timmins, to advise the Golborne Company as to how they could best supply themselves. Acting upon his advice, they increased their capital from £1400 to £3500, and improved their supply. In 1876, the Leigh Gas Authority determined to extend their mains in order to supply Lowton (the intervening place between Leigh and Golborne); but they never left their own district. In May, 1900, the Golborne Gas Company having by that time created a very satisfactory business, Leigh was again asked to supply some houses in Lowton; and they then carried on their main to a place called Lane Head. They laid a 3-inch main, and went past Lane Head (which was the junction point whence gas would have to be supplied to Golborne if at all) without putting down a junction-pipe, which, together with the small size of the main, showed that they had no intention of going to Golborne. In November, 1900, it became known that the Golborne Company were going to apply for the present Bill; and on the 13th of that month, the Leigh Gas Committee recommended their Corporation to oppose the Bill. On Dec. 23, the Town Clerk of Leigh reported to the Gas Company that he was instructed to oppose their Bill; and on the same day it was resolved by the Leigh Corporation to lay mains in Golborne. On Dec. 21, the Corporation received notice from the Gas Company of the withdrawal of the intention of the Company to apply to Parliament to repeal the power of Leigh to supply in Golborne, which was one of the objects of the present Bill. On that the Town Clerk of Leigh reported that he was instructed to oppose the Bill; and the Corporation passed a resolution that they would give a supply of gas to Golborne, and supply cheaper than they were doing in Lowton—though going to Golborne would involve large expenditure for laying longer mains. They set to work to lay the mains in December, January, and February, though these were months in which no gas engineer, if he could help it, would lay a single pipe. They laid a 9-inch pipe till they came to the bridge of the London and North-Western Railway Company, when they discovered that there was not sufficient depth to continue, so they contracted the 9-inch main into a 6-inch one over the bridge, and then reverted again to a 9-inch pipe. So they continued until they came to Lane Head, then they contracted it again into a 6-inch main. All the way from Leigh to Lane Head they had a 3-inch main. They came now to ask the Committee to say that this was a *bonâ-fide* exercise of their powers, which had been lying dormant for forty years; and they suggested that, by reason of the exercise of these powers, they should be heard to-day to prevent the Golborne Company getting the privileges they asked for as the necessary outcome of the work they had been doing for forty years in Golborne. Since the passing of the Bill in the Commons, the General Purposes Committee of the Leigh Corporation had held a meeting to decide whether or not they should be content with the decision of that House. There were 22 gentlemen present; and of these 12 voted against proceeding, and 10 voted for an appeal to their Lordships' House. The people, however, who were anxious to press the matter forward called an extraordinary meeting on June 5; and then a resolution in favour of appealing was carried by a majority of 1—13 to 12. At an evening meeting on the same day, the votes were 13 to 13. The Chairman used his casting vote; and that was how the Bill came before their Lordships. The Company needed this Bill, in order to secure power to break up roads and free themselves from the attacks of Leigh, who wanted to crush them out of existence or force them to sell their property at a dead loss.

Mr. *Frederick Silcock* said he was Chairman of the Golborne Gas Company, which had a subscribed capital of £10,000, of which £7000 had been paid up. He gave evidence as to the large growth in the Company's business, a diminution of the prices charged, and an increase of dividends from 5 per cent. in 1890 to 7½ per cent. in 1900.

Mr. WEDDERBURN (in cross-examination): Why should you take from the Leigh people a portion of that for which, in 1874, they paid?

*Witness:* We wish to supply our own place.

Do you know that, so far from the Golborne Gas Company being discontented, in 1881 they approached the Leigh Board and asked if they would sell to the Golborne Company their statutory rights in Golborne?—That might be so; but I do not know it.

A letter written by a former Chairman of the Company was shown to witness at this point, after which he said he agreed that a letter of the description suggested by Counsel had been written.

Mr. WEDDERBURN: If the Bill went through, we should not have a right to take up our pipes.

Mr. RAM said that, to meet this point, he would consent to a clause being inserted that the Bill was not to come into operation for three or six months, so as to enable the Corporation to remove their pipes.

Mr. WEDDERBURN: What would happen to the 56 customers who, within our statutory rights, we supply in Golborne.

Mr. RAM: We will supply them to-morrow.

Mr. *Joseph Timmins*, Engineer and Manager of the Wigan Gas-Works, said he was for thirteen years (from 1874 to 1887) Gas Engineer to the Leigh Corporation. He was at present Consulting Engineer to the Golborne Gas Company. In 1870, on the instructions of the Leigh Gas Committee, he made an investigation, to see whether it would pay Leigh to supply Golborne. He reported that it would be neither desirable nor remunerative to lay gas-mains to Golborne; and thereupon he was instructed to let the matter drop. The Leigh Gas Committee

willingly consented to a request of the Chairman of the Golborne Company that witness should give his services to the Company, with a view to improving the quality of the gas and the supply generally; and the suggestions he made were, at considerable expense, carried out by the Company. There was no intention then, nor up to the time he left, on the part of the Leigh Corporation to supply Golborne. The way in which the Corporation had laid their mains to Golborne afforded proof positive that they had no intention of supplying in Golborne. He would not have advised the Golborne Company to spend sixpence in improving their supply, if he had had the least suspicion that Leigh would seek subsequently to supply Golborne.

Mr. *Corbet Woodall* said the Golborne Gas Company were now in a position to give a satisfactory service; and they had been giving a proper supply. To meet the growth in the Company's business, the further capital powers of £15,000 were very reasonable. No doubt benefit would be conferred on the Company if the present Bill were sanctioned; but the advantage would be simply in giving the shareholders security for the capital they had invested. Unless the Company obtained the protection sought in the Bill, they would be at the mercy of the Leigh Corporation. Seeing that the Corporation had had these powers, without using them, for forty years, he did not think the Golborne Company, who had always done good work, should be longer left at their mercy. The present step was necessary to secure the capital. It was advisable the Company should go on increasing their works; but they would not do this if they were liable to be ousted at any moment. The Corporation of Leigh, in 1876, authorized their Engineer to advise the Golborne Gas Company in the matter of extending their works, which was a clear indication that the Company could continue to supply Golborne, and that the Corporation did not intend to go there themselves. Everything showed that, until this Bill was promoted, Leigh had no intention of supplying Golborne.

Mr. WEDDERBURN (in cross-examination): Do you think it would be a fair thing to take from Leigh the right to compete?

*Witness:* Yes; I do. The time has arrived when the Golborne Company ought no longer to be subject to the possibility of the competition of Leigh.

Mr. *Thomas Newbigging* said he knew a similar case to the present—that of Milnrow—in which, in 1869, he gave evidence. The Corporation of Rochdale were the owners of gas-works; and within their limits was Milnrow. In Milnrow there was a non-statutory Company who, as in the present case, had purchased the works from a private owner. As they began to grow, the Company thought it proper to come to Parliament, in order to obtain security for their capital; and in 1869 they promoted a Bill. Immediately the Company gave notice, the Rochdale Corporation, who had never supplied Milnrow, ran a 14-inch main right through the district, just as the Leigh Corporation had done here. These facts were laid before the Committee, and the Milnrow Company obtained their Bill; being granted the exclusive supply in their district. A fear was, however, expressed that depriving Rochdale of this particular privilege might affect their status in other portions of the area; and therefore a clause was inserted saving the rights of Rochdale within the other area. Another case occurred in 1865, when the Tyldesley Board obtained powers to purchase the gas-works supplying their district. At that time the Leigh Gas Company were empowered to supply gas within the Tyldesley district; but their area was curtailed, and no compensation was given.

Cross-examined by Mr. WEDDERBURN: He did not know that by the Act of 1861 Tyldesley was put into a special position; a provision being inserted in the Act that the Leigh Company were not to lay mains or erect gas-works inside a certain radius in Tyldesley, without the consent in writing of the Company.

This closed the case for the Company.

Mr. BALFOUR BROWNE said he did not think it would be necessary to call evidence on behalf of the Leigh Corporation. The matter before the Committee was one of paramount importance, not only to Leigh, but to the county generally. The proposal of the Company was absolutely unprecedented. The whole object of the Bill, from beginning to end, was merely to enhance the value of the undertaking for the purposes of sale; for the Company knew an arbitrator would consider the fact that Leigh could compete. There must be a public case for such a Bill as this. The object was to make the Company a monopoly concern. Was this in the public interest? Surely, the public wanted the choice of taking gas from either the Corporation or the Company; but under the Bill they would only be able to take the Company's gas. They knew they would be expropriated; and the result of putting in the clause he had referred to would add thousands of pounds to the value of the concern. This must be contrary to the interests of the public, besides being quite improper. He asked the Committee to cut out the provisions excluding the Corporation from supplying in the Company's area. But he did not wish to ruin the Company by competing with them; and therefore he offered to buy them out on fair terms—by which he meant that, while the arbitrator should consider that they had been supplying a long time, and had a large number of customers, he should also take into account that the Corporation had statutory powers to compete. He denied absolutely that the Bill was in the public interest; and there was no case where a local authority or company had had such powers as Leigh possessed taken away from them without compensation.

The room was then cleared. On the re-admission of the public,

The CHAIRMAN said: The Committee are prepared to find the preamble of the Bill proved; but there must be some arrangement made by which the Leigh Corporation can take away their pipes.

Mr. WEDDERBURN: Is there to be any compensation to the Leigh Corporation for the cost of laying the pipes?

The CHAIRMAN: No; no compensation. That question has been particularly considered.

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Next day a clause was brought up and agreed to, by which the Leigh Corporation were directed, within three months after the passing of the Act, to take up and remove all gas mains, pipes, and apparatus belonging to them within the urban district of Golborne, and empowering the Corporation to charge the expenses of so doing on the general rate. The other clauses having been adjusted, the Bill was ordered to be reported.

# LEGAL INTELLIGENCE.

## The Uneven Laying of Pavement—Damages Against the Bristol Gas Company.

At the Bristol Assizes on the 15th inst., an action for damages by Emma Cridge against the Bristol Gas Company was heard. Mr. Metcalfe, for the plaintiff, stated that she went on Jan. 28 to Kingsdown at about 9.55 p.m.; and while there tripped over an uneven piece of pavement. She fell heavily to the ground, injuring her face and sustaining slight concussion of the brain. Her sense of smell went for a time, and would never be perfect again; and she was permanently disfigured. The Gas Company had taken up the pavement on Jan. 23 to do something to the service-pipe of a neighbouring gas-lamp, and temporarily restored the pavement, leaving it in that condition until a day or two after the accident to Mrs. Cridge. Dr. Kerfoot said the plaintiff's nose was fractured; and she was under his care for about a month. The bridge of the nose was thickened, and the sense of smell was nearly gone. He did not think it would ever come back entirely. Mrs. Florence Oliver, sister of the plaintiff, Mrs. Lloyd, and Mrs. Hellicar gave evidence. Mr. Duke, K.C., for the Company, said that their workmen had restored all the paving as well as was possible, having regard to the fact that some of the stones had been broken. These were replaced by sound ones by the Sanitary Authority. The workmen gave evidence, one of them saying that the stones were broken before they began the work; and they embedded them in ashes. Four residents said the stones were properly replaced, and did not rock or stick up. The jury, however, found for the plaintiff, awarding her £75 damages.

## A Sunken Trench—Damages against the Bristol Gas Company.

At the Bristol Assizes last Saturday week, an action was heard in which Mr. F. Poole Lansdown, M.R.C.S., sought to recover damages from the Bristol Gas Company for injuries caused by the negligence of their servants. The facts, as stated by Mr. Metcalfe for the plaintiff, were these: On Aug. 30 last year, at about 6.30, the plaintiff, an experienced cyclist, was riding home from Portbury. When nearing the Suspension Bridge, he was suddenly thrown from his machine, and sustained injuries to his head, a fractured shoulder blade, and injury to the hip. The plaintiff was rendered unconscious for a time; but there were witnesses who would describe a sunken trench which had been left in a dangerous condition by the Gas Company, who had recently put in a service-pipe to Towerhurst, Leigh Woods. The plaintiff claimed £190 special damages, in addition to such sum as the Jury might award for his suffering. The plaintiff went into the box, and said he was in his 68th year, and had been a cyclist six or seven years. His usual pace was eight miles an hour. The Rev. Archibald Sewell, Mr. Charles Phillips, a postman, Mr. F. E. Metcalfe, solicitor, Mr. J. Hawkins, Surveyor to the Long Ashton Council, Dr. Lansdown, plaintiff's son, and Dr. Bertram Rogers, gave evidence as to the accident, the dangerous state of the road, and the injuries sustained by the plaintiff. Mr. Duke, K.C., for the defence, reminded the Jury that cyclists rode on the highways as highways, and took the risk of there not being cycle tracks. Several of the Gas Company's employees were called to show that the road was properly restored. Inspector Harvey, of the Suspension Bridge, said from July 12 to Sept. 1, 9800 cyclists went over the bridge; and it was moderately estimated that half of them returned. No accident was reported except the one to the plaintiff, and no complaint was made. The Jury awarded plaintiff £350 damages.

## Committal for Stealing Gas at Gateshead.

A man named William Banns was brought before the Gateshead Magistrates, last Friday, on a charge of stealing gas, of the value of £2 6s. 8d., the property of the Newcastle and Gateshead Gas Company, between February and July of this year. Mr. E. Clark said the theft was an impudent and ingenious one, and they thought the fine of £5 allowed by the Act was inadequate. Accused had had a house at Heaton, and after he left it a discovery was made which showed that the main pipe had been tapped before it reached the meter, and gas had been obtained without liability being incurred for payment. Later the new house of the accused was visited by the Gas Company's men, who stated that they had come to see about the water. It was then found that a similar fraud was going on. The £2 6s. 8d. was for the lowest estimate that could be made of the gas that must have been used. He asked that the prisoner should be severely, but not too severely, dealt with. George Proud, in the service of the Gas Company, said the sum in the charge had been arrived at by basing the cost on an estimate of 40 cubic feet of gas for three hours a day. For six months this was abnormally low. Mr. W. H. Ord, who appeared for the prisoner, said he was instructed that the gas had only been used on a Sunday. His client pleaded guilty, and said that what he had done was through weakness. He had a wife and four children depending on him; and it was they who would suffer. It was a first offence, and he asked for the infliction of a fine, if that were possible. Mr. Hall, the employer of the accused, gave him an excellent character, and said he was prepared to take him back. The Bench sent him to prison for four months.

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**Reductions in Price.**—The Directors of the Wigton Gas Company have decided to reduce the price of gas from 3s. 9d. to 3s. 4d. per 1000 cubic feet, and to abolish the discount system. The price of gas in Durham has been brought down from 3s. to 2s. 9d. The Cradley Heath Gas Company announce a reduction in the price of gas of 2d. per 1000 cubic feet. The Darlington Gas Committee will, at the next Council meeting, recommend a reduction of 6d. from the end of the current quarter; bringing the price down to 2s. 3d. net.

# MISCELLANEOUS NEWS.

## THE INSPECTION OF GAS LIQUOR AND OTHER WORKS UNDER THE ALKALI ACTS.

### District Inspectors' Reports—Chief Inspector's Report for Scotland

We continue to-day our notice (see *ante*, p. 162) of the report of the Chief Inspector under the Alkali, &c., Works Regulation Acts (Mr. R. Forbes Carpenter) for the past year by giving some extracts from the reports of the District Inspectors, and from Mr. Carpenter's report to the Secretary for Scotland, by which they are followed.

As in previous years, the first district to be noticed is Ireland, which is under the supervision of Mr. E. G. Ballard. He reports that 25 sulphate of ammonia and 7 tar works were registered in the past year, and that 65 separate processes came under inspection. There were 113 visits paid, and 90 tests made. The sulphate of ammonia works are carefully conducted, and the continuous system of distillation is gradually supplanting the old intermittent still; the proportion of liquor treated by the two methods being respectively 93 and 7 per cent. The following is the proportion of sulphuretted hydrogen treated in various ways in terms of sulphate made and percentage of total make: Oxide purification, 92·30 per cent.; retained by lime, 0·70 per cent.; by combustion, 3·40 per cent.; by metallic salts, 3·60 per cent. Products equivalent to 2778 tons of sulphate of ammonia were made during the year. Mr. Ballard has nothing new to report with regard to tar-works. Where tar is distilled, proper appliances are provided for dealing with the noxious vapours given off at certain stages of the manufacture.

In the district embracing the North of England, Mr. J. W. Young reports that 44 sulphate of ammonia and 6 tar works were registered during the past year; the number of processes in operation being 163. There were 232 visits paid to sulphate of ammonia and tar works, and 10 tests made, out of the total of 622 visits and 648 tests for the entire district. The total production of sulphate in the district was 12,105 tons; being an increase of 4·7 per cent. over that of 1899. The greater portion of the liquor continues to be distilled on the continuous system—40 works, or 78·4 per cent. of the whole number, so treating 96·6 per cent. of it; the remaining works distilling 3·4 per cent. of the liquor on intermittent principles. Oxide of iron purifiers are still the general means of destruction for the foul gases evolved from the saturators of sulphate of ammonia plants. At one works, however, the gas is burnt in a special furnace, with cooling pipes and a limestone tower as accessory plant. Mr. Young says it has been difficult to ensure at all times an adequate supply of air for complete combustion, with the result that the tubes have been choked with sublimed sulphur. The corrosive effects of the products of combustion have also given trouble. The acidity of the gases entering the limestone tower has been, on an average, 79·1 grains of sulphur trioxide per cubic foot, and of the exit gas 6·1 grains; showing a condensation of 92·2 per cent. Two works with Semet-Solvay coke-ovens and residuals-recovery plant have lately begun to manufacture. One additional tar-works has been registered, and is in operation; due care being taken to prevent the evolution of noxious vapour. At one works, a man's reckless disregard of the owners' rules nearly cost his own life and that of two companions. He entered an emptied tar-still prematurely, and without troubling to sever a connected pipe as he should have done, and was overpowered by the fumes. His companions entered the still to rescue him, and were themselves successively overpowered. Curiously enough, the offender was a man of long experience.

In addition to Ireland, Mr. Ballard has under his supervision Cheshire, North Wales, and part of Lancashire, constituting District No. 3, in which there are 3 gas liquor, 21 sulphate of ammonia, and 6 tar works, out of the 94 registered in the district. The number of separate processes which came under inspection at these works is 131; and though works may be registered under a special heading, other manufactures are carried on which need the attention of the inspector. Out of the 131 processes, 5 are connected with gas liquor, 24 with the manufacture of sulphate of ammonia, and 12 with the distillation of tar; and 126 visits were paid in respect of these particular processes, out of the total of 436 for the district. Mr. Ballard reports that the works registered for the production of sulphate of ammonia were all carefully conducted last year, with one exception. In that case manufacture was being carried on with defective plant on the occasion of one of his visits, and much sulphuretted hydrogen was being permitted to escape direct into the atmosphere. Proceedings under section 9 of the Act of 1881 were commenced; the maximum penalty being paid by the proprietors without taking the matter into Court. The old plant was stopped, and it is intended to erect new on the continuous instead of the intermittent system. The proportion of liquor distilled by the former process is 96·4 per cent.; by the latter, 3·6 per cent. The proportion of sulphuretted hydrogen treated by various methods in terms of sulphate of ammonia made and percentage of total make is as follows: By the Claus process, 3·43 per cent.; by oxide of iron, 28·21 per cent.; by combustion, 13·97 per cent.; precipitated by metallic salts, 54·39 per cent. Mr. Ballard reports that all the tar-works were carried on without complaint during the year.

The district comprising Widnes and Runcorn is, as usual, reported upon by Dr. Affleck, who furnishes some interesting particulars in regard to his labours. In his district, works of every description were in very regular, and many even in full, operation throughout the year. The number of visits of inspection was 648; and, in addition, 11 visits were paid to other registered works not in the district. The working of the various processes was regularly inspected, and controlled when necessary; and the maintenance of the apparatus in good working order was carefully watched. In these respects, the year's inspection was, in the main, very satisfactory; the owners generally showing much alertness in doing everything in their power to comply with statutory requirements. Several quite new plants were erected, the construction of which was inspected and approved as well adapted for carrying on the processes for which they were put up. Many portions of the old plants were entirely rebuilt. In two instances only did defective construction and maintenance render serious remonstrance necessary. On these visits, numerous samples were taken of the acid and other noxious gases escaping from the works by the chimneys and other exit flues. Only a very small number of them were found to exceed in acid contents the specific limits imposed by the Act of 1881; and as none of these excessive escapes were of a serious nature, and all of short duration and satisfactorily accounted for as due to accidental and unforeseen causes, it was not found necessary to make any the basis of a prosecution. There are still only five sulphate and muriate of ammonia works in the district; and they gave last year little cause for complaint in respect of escapes of noxious gas. The various methods in use for disposing of the sulphuretted hydrogen contained in the foul gases evolved during the process were employed in the following proportions, calculated on the amount of sulphate made under each method of treatment: Using pyrites burners, 28·7 per cent.; using oxide purifiers, 26·4 per cent.; using furnace fires, 44·9 per cent. About half of the liquors treated by furnace fires contained only traces of sulphuretted hydrogen. New plant for the distillation of tar, with tar-stills, was erected at one works. It was well designed and of substantial construction, doing excellent duty, though not in continuous operation. The foul gases are dealt with in an oxide purifier. The apparatus employed in the different works has been well maintained.

In North and East Lancashire and part of Yorkshire, the district over which Mr. H. Porter presides, there are 14 liquor and 40 sulphate and muriate of ammonia works registered. One works stopped and another started during last year. The total quantity of liquor distilled, equivalent to sulphate of ammonia, was 17,813 tons; the proportion distilled by the continuous process being 99·28 per cent. The methods of dealing with the foul gases evolved were as follows: Absorbed by lime or oxide of iron, 58·17 per cent.; passed to the vitriol chamber, 14·97 per cent.; treated by the Claus process, 22·18 per cent.; treated by other processes, 4·68 per cent. Most of the sulphuretted hydrogen from the 58·17 per cent. of the liquor treated was absorbed by oxide of iron. The new works registered is a large gas-works where the waste gases are sold to a firm who treat them in suitable purifiers—the firm being chemical manufacturers, and registered under the Act for other processes. Alternative plant exists also at the new works, for use in case of emergency. The Claus plant erected at one works last year has not altogether given satisfaction, owing to the difficulty experienced in keeping up the temperature of the kiln without getting an excess of air, and consequently acid formed in place of sulphur, and the limestone scrubber frequently required to be recharged. The exit from the chambers into the limestone scrubber on two occasions was 16 and 18 grains, and that from the limestone scrubber passing to the oxide purifier 0·5 grain, per cubic foot. The probable explanation is that the capacity of the kiln is too large for the quantity of gas to be treated. In order to overcome the difficulty, it was proposed to the Manager to reduce the interior capacity of the kiln by packing with brick, and also to cover the kiln with a non-conducting material; and this is to be done. At two works air is employed, while the process is working, to assist the revivifying of the oxide. In one case an air-pump is used to pump air into the condenser for cooling the waste gases, for a few hours each day; and in the other case a small steam-injector, to force air into the purifier through a pipe ¾-inch in diameter and from 30 to 40 feet long, placed on the side of a wall in three or four lengths, and in such a position that the condensed steam is run off at the hot end. When first adopted, the purifier grids caught fire; but it has been found that the time must be limited for its employment. There are 30 works for the distillation of tar in this district; being one more than the number registered in 1899. There were no accidents or explosions in stills or water-seal vessels. One firm successfully treated the waste gases from the stills by absorption with a wet process, to which reference was made in the Chief Inspector's report (*ante*, p. 162.) Much benefit and satisfaction have been experienced by manufacturers who have adopted the high-crowned bottom stills, as it is found that less fire is needed to heat the tar, owing to the better distribution of heat; and with less heat locally there is not so much trouble caused by the carbonizing or coking on the bottom of the still.

In the East Midland district, which is under the supervision of Mr. E. Morley Fletcher, an addition of two new sulphate of ammonia works was made during the year. They derive their liquor from coke ovens, and the sulphuretted hydrogen evolved is absorbed in oxide of iron. Both use continuous stills. In one works the oxide-purifying area has been increased, and partial revivification *in situ* is obtained by chimney draught drawing air through the oxide of the purifier not in use. This method is employed at the two new works; making in all six works where revivification by this means has been adopted. At another works, a continuous still has taken the place of the intermittent form of distillation; and Mr. Fletcher states that the results have proved satisfactory both as to yield of salt and greater ease of dealing with the foul gases. Tests have been made of the gases entering and leaving the limestone tower in connection with the Claus process at the only works in the district where this is carried on; and they show an average acidity, calculated as grains sulphuric trioxide per cubic foot, of 11·5 grains entering, 0·15 grain leaving, and an average absorption of 98·9 per cent. The gases afterwards pass to an oxide purifier, where the sulphuretted hydrogen is absorbed. The total quantity of ammoniacal products manufactured during the year amounted to 15,148 tons calculated as sulphate of ammonia, and the proportion of sulphate and muriate of ammonia made by the continuous process was 95·36 per cent., compared with 94·2 per cent. in 1899. Of the total sulphuretted hydrogen produced, the proportions treated by the various methods of disposal, expressed in terms of the sulphate equivalent of the liquor distilled, were: 30·03 per cent. in vitriol chambers, 35·17 per cent. by the Claus process, and 34·80 per cent. by oxide purification. No change was made last year in the number of works where tar is distilled; but additional stills were erected at three works. The gases from the worm-ends were dealt with as before; and the plants generally were in satisfactory order.

Coming to the South Midland district, over which Mr. E. Jackson has supervision, we learn that at 83 works in the district plant has

been erected for the manufacture of ammonia products—sulphate, muriate, or carbonate—or the concentration of gas liquor. At two of these, the sulphate plants remained idle last year, and the liquor was sold pending reconstruction. The proportion of ammoniacal liquor distilled by gas companies, coke-ovens, and carbonizing (coal) and iron-works, on the works where it is produced, and not sent away as crude liquor for use elsewhere, is 59·2 per cent.; while the proportion distilled by private firms receiving the crude liquor from gas and other works is 40·8 per cent. Of the entire bulk of liquor distilled in the district, 83·74 per cent. is produced in ordinary gas-works. Three new plants for the manufacture of sulphate of ammonia were registered last year. In the first case, a continuous still with closed saturator, supplied with a Wilton elevator, has been put in. Iron pipe condensers, water cooled, have been attached, and also two brick oxide of iron purifiers, with cavity walls filled in with pitch, supplied with change-valves for alternate revivification *in situ*. Steam-jets, to further assist in clearing the purifiers from sulphuretted hydrogen and carbonic acid before emptying, are fixed. The "devil" liquor is run into the crude ammoniacal liquor well, and so returns to the still. Plant similar to the one just described, and attached to bye-products coke-ovens, was put into operation last year at an adjoining colliery; and a third of the same dimensions is in course of erection at another colliery in the district. The second plant was erected at a gas-works. A continuous still and an ordinary fishing-box saturator have been put in, with iron pipe condensers, air and water cooled; and a brick oxide of iron purifier, with cavity walls filled in with pitch, has been attached. The "devil" liquor is returned to the still. The other place where sulphate plant was erected last year stands alone. It was put up to deal with the liquor from a large gas-works. The plant consists of a continuous still, with self-discharging saturator, iron pipe condensers, water cooled, and two brick oxide of iron purifiers, with cavity walls filled in with pitch. Change-valves for alternate revivification *in situ* are fixed. The "devil" liquor is returned to the still. Self-discharging saturators of the Colson type are increasing in number, and Mr. Jackson says they offer decided advantages for a large make of sulphate; but care has to be exercised in construction as well as dimensions, so as to arrive at the correct proportions of the saturator to the still. In this the form of still, and the method by which it is supplied with steam, are factors which have to be considered in making the best workable saturator. He adds that the one in operation at the Leicester Gas-Works is doing excellent work; 90 tons of sulphate of ammonia per week being turned out from the one saturator. There has been no further extension of the Claus process for dealing with the sulphuretted hydrogen; but there are, he says, several works, which are now sufficiently large, where it would be advantageous to adopt it. Mr. Jackson considers that the weak point in the Claus plants is the hot end of the sulphur chambers near to the kiln, where frequent rebuilding is necessary. This is due to the cracking of the brickwork owing to the variation in temperature. Constant watchfulness is therefore necessary at this point, to prevent the escape of noxious gases after the chambers have been in use for some time. This difficulty does not extend to the cooler part of the chambers, where there is little change of temperature. Of the total quantity of liquor produced in the district, 97·23 per cent. was distilled by the continuous, and 2·77 per cent. by the intermittent process. The sulphuretted hydrogen produced from the distillation of 47·02 per cent. of the liquor was treated by oxide of iron or lime, and 13·99 per cent. by the Claus process. The number of tar-works on the register is 22—the same as before. There are two methods mainly in use for dealing with the offensive gases escaping condensation in the worms—viz., burning in coal fires and arresting in oxide of iron. In several works preliminary scrubbing with heavy oil is resorted to. The worm-end gases at nine works are arrested in oxide of iron; at two in lime; and at eight they are burnt.

Reporting upon the district embracing the South-West of England and South Wales, Dr. Alfred C. Fryer states that there are 68 works registered where the manufacture of sulphate and muriate of ammonia is carried on; and the total quantity of ammoniacal compounds produced during last year amounted to 8299 tons, calculated as sulphate of ammonia. The old intermittent method of distillation has been abandoned at two works, and continuous stills, with good condensers and larger purifiers, have been erected. New oxide purifiers, double the size of those previously employed, have been erected at two other works; and two new purifiers are in use at a third. Hydraulic valves are now employed at all works where there are two purifiers. Even in this case, the managers at one of the larger works have thought it good to caution their workmen in the following words: "In emptying or filling purifiers, the sulphate plant must be stopped—that is, the steam and ammonia to the saturator must be shut off while this is being done. Also, there must be at least two men at work in filling or discharging, and one man must remain outside while the other is at work inside filling or discharging the purifier. The sulphate men are cautioned to be careful in carrying out the above order." The proportion of liquor distilled by the continuous process last year was 77·6 per cent., and the proportion of sulphuretted hydrogen treated by oxide of iron 75·4 per cent. of the total make of sulphate. The distillation of tar is carried on at eleven works in this district. The methods in use for dealing with the two sources of nuisance arising from tar distillation—viz., gases and vapours escaping from the worm-ends of the condensers and the cooling of pitch—are very much as described in previous reports. Additional stills have been erected at two works.

Mr. F. Napier Sutton presents, as usual, an interesting report on the district comprising the Eastern and South-Eastern Counties, in which there are 66 sulphate of ammonia and 9 tar-distillation works. Sulphuretted hydrogen derived from the distillation of gas liquor is utilized as a source of sulphur for making acid in seven sulphuric acid works; and an increased quantity of acid was made from this source last year. A set of chambers at one works was kept going the whole year with sulphurous acid derived from the combustion of this noxious gas, as was also the case for some months in 1899. Figures were given in the report for that year, showing the quantity of sulphur thus used per day, with the chamber space required. The latter is remarkably low, considering the large quantity of diluent gases, particularly carbonic acid, necessarily present. The number of sulphate of ammonia works under inspection in the past year was 75; and, with the exception of one small works, all were in operation. The total quantity of ammoniacal compounds manufactured amounted to 45,525 tons, calculated in terms of sulphate of ammonia—an increase of 1462 tons on the quantity made in the previous year. The whole of it was derived from the treatment of the ammoniacal liquor obtained in the distillation of coal, with the exception of an inconsiderable amount derived from the carbonization of bone for the manufacture of animal charcoal, and a small quantity extracted from spent oxide. The products made consisted chiefly of sulphate; but increased and considerable quantities of carbonate and nitrate, liquid (refined), and anhydrous ammonia were also produced. The number of works using the old intermittent method of distillation shows further decrease; and 98·44 per cent. of the liquor treated was distilled by the continuous process. The gas companies produced 85·6 per cent. of the ammoniacal compounds; and the balance was made by private firms. Of the entire bulk of liquor, 98·44 per cent. was distilled by the continuous process. For the most part, the sulphuretted hydrogen was treated in vitriol chambers (69·1 per cent.); only 6·8 per cent. undergoing oxide purification. The reason of the large percentage first stated is that sulphuretted hydrogen is now used directly for sulphuric acid manufacture at seven works. The number of works using the Claus sulphur-recovery process shows no change; and the proportion of gas treated remains constant. Eight sets of kilns and chambers were in use last year, and were periodically examined and tested for efficiency. The terminal limestone scrubbers and purifiers for arresting the sulphur dioxide and sulphuretted hydrogen in all cases proved adequate to prevent any discharge of these gases into the air; and the chemical tests applied were of real assistance in guiding the users to maintain a proper reaction in the kilns. Treatment of the saturator gases by oxide purification was in use at 43 works last year; while the proportion of gas dealt with by this means amounted to 6·8 per cent. Revivification of the oxide *in situ* by the use of automatic change-valves with chimney connection has been adopted with advantage at another works, and overhead protection by light span roofs on uprights, allowing space for observation and recharging, has proved advantageous to open purifiers in exposed positions. At one works, concurrent revivification is carried out by the admission of air by a steam-jet into the foul-gas main. The scrubber in use at the end of the condensing plant became completely blocked; and, on examination, the trouble was found to be due to free sulphur. It would appear that by some means limited oxidation of the sulphuretted hydrogen occurred similar to that aimed at in the Claus kiln reaction. Mr. Sutton does not know of any case where such a reaction has taken place under similar circumstances, and its occurrence is difficult to explain. He goes on to offer the following remarks upon the treatment of sulphuretted hydrogen by the new method of burning:—

The comparatively new method of burning the sulphuretted hydrogen in a special furnace, and neutralizing the sulphur dioxide produced by passing the gases, after cooling, through scrubbing-towers packed with hard limestone, has been in use at four works, although in one case it was not in operation throughout the whole year. The proportion of sulphuretted hydrogen treated by the neutralization method is 5·2 per cent. of that evolved in the district. The average working results, as well as the best recorded results, are tabulated below; and it is there seen that the best average results have been obtained at No. 2122.* This has resulted from a modification which has been introduced in regard to cooling the furnace gases prior to their passage through the limestone scrubber.

| Average Neutralization Effected as shown by Test taken throughout the Year. | | | Best Results Obtained when Neutralizing Plant Working Effectively. | | |
|---|---|---|---|---|---|
| (*a*) | (*b*) | (*c*) | (*a*) | (*b*) | (*c*) |
| 55·50 | 0·67 | 98·80 | 73·00 | 0·70 | 99·05 |
| 45·45 | 9·53 | 79·04 | 40·45 | 1·80 | 95·50 |
| 72·08 | 6·86 | 90·49 | 90·40 | 2·60 | 97·13 |
| 39·05 | 6·07 | 84·46 | 65·60 | 0·15 | 99·77 |
| 53·02 | 7·71 | 88·19 | 67·36 | 1·31 | 97·86 |

(*a*) Acidity of furnace gases entering scrubber as grains of $SO_3$ per cubic foot. (*b*) Exit gases from neutralizing scrubber as grains of $SO_3$ per cubic foot. (*c*) Average percentage of acid neutralized.

Hitherto atmospheric cooling in iron pipes has alone been tried; and not only is a considerable amount of cooling power required, but there is distinct wear and tear upon the cooler portions of the pipes by reason of the acid character of the condensed moisture. To obviate the use of iron condensing-pipes, and to assist the draught by the rapid cooling of the hot furnace gases, a simple washer-condenser was introduced at No. 2122. This consists of a circular stoneware tower, 3 feet in diameter and 9 feet high, fitted with a luted water-distributing apparatus at the top, and having three perforated plates (numerous 3-inch holes) inside to bring the water and gases into more intimate contact. The gases enter at a high temperature by a short length of iron pipe direct into the top of the wash-tower, and pass away at the base through a stoneware pipe to the limestone scrubber. The cooling of the gases is very complete, and can be regulated by the water supply. The cooling water used necessarily dissolves some of the sulphurous acid; and the acidity of the gases is thereby reduced, and the limestone tower relieved of a proportionate amount of work. The acid liquor from the washer-condenser is best dealt with by running it to the spent-liquor settling-tanks, where it is instantly neutralized by the caustic lime or lime salts present. A further advantage of such a cooler is the removal of any sublimed sulphur, should oxidation of the sulphuretted hydrogen in the furnace be incomplete through defective draught; but as the rapid cooling of the gases induces better draught, sublimation is less likely to occur. The adoption of this form of cooler is a very great advance, and it is about to be introduced into other existing plants.

Mr. Sutton states that at two works the saturator gases from the sulphate plant is passed to the hydraulic main, to be dealt with by the coal-gas purification plant; while at two other works the sulphuretted hydrogen is retained *in situ* by lime or metallic salts. The proportion of gas treated by these means amounts to 3·4 per cent. Both the number of works at which the crude method of disposal of the sulphuretted hydrogen by combustion in the retort or boiler flues, and the

*The results from the works indicated are given in the first line of the table.—ED. J.G.L.

proportion so dealt with, show further distinct reduction. The latter figure fell from 6·9 to 3·9 per cent. in the past twelve months; and a further reduction is expected in the near future. Approved methods of treatment were nearly completed at two of the nine works at which burning the gas is still practised, when the report was written. Complaint of nuisance and damage was made by a photographic plate manufacturing company against a gas company at whose works sulphate of ammonia manufacture had been recently started; and an action was ultimately entered for an injunction and for damages. In reference to this matter, Mr. Sutton says—

> It is very probable that such a delicate and sensitive industry as the manufacture of photographic plates and paper suffered from the proximity of gas manufacture, where oxide and lime purifiers must be discharged, and tar pumped from storage-tanks to barges, especally as the make of gas at the works in question has increased by leaps and bounds in the past few years, owing to the enormously rapid development of the district. The onus of the alleged injury was fixed by the plaintiff company upon the recently erected sulphate plant, which was of modern and approved design, and combined every necessary appliance for safeguard from nuisance. A large number of expert and other witnesses were retained on each side; and I was subpœnaed by the defendant company. At the last moment, the case was settled upon the terms that the action was dismissed; the plaintiffs paying all costs of the defendant company.

This was the only case which came to Mr. Sutton's knowledge during the past year of alleged nuisance arising from sulphate of ammonia works. The number of works at which gas tar is distilled remains as before—viz., 17—and about 120 stills of various types and capacity are employed. Mr. Sutton expresses his satisfaction in reporting that steps have been taken to erect modern distillation plant at certain works which have always been far behind all others in the district. Objection has had to be taken on more than one occasion to the inefficient condition of the appliances in use for drafting the permanent still gases from the receivers, and for dealing with them; and it has been necessary to impress upon those responsible that any breakdown of such appliances by corrosion or accident should at once be repaired, otherwise serious notice must be taken of such contravention of the requirements of the Act. The condition of the large works under skilled direction has been satisfactory; and no complaint of nuisance from works engaged in the distillation of tar was known to occur in the past year.

The report of the Chief Inspector to the Secretary for Scotland includes, as usual, the details of the work done by the District Inspector (Mr. W. S. Curphey). The number of works registered is the same as in 1899—viz., 127; and that of processes carried on shows very little variation from previous years, though there are a few among the individual works. Mr. Carpenter says there was an increased production of sulphate of ammonia from gas liquor last year; but no new method was employed for dealing with the offensive gases evolved during its manufacture. Sulphate, muriate, or hydrate of ammonia was made in 68 works—an increase of three. This is due, Mr. Curphey explains, chiefly to the more widely extending practice of the erection of sulphate of ammonia plant at gas-works, for dealing locally with the liquor produced in the course of purification, instead of sending it away. Despite the increased number of works, however, the production of salts of ammonia shows a contraction, on the whole, as compared with 1899. An increase occurred in the production from gas liquor, and from the recovery of bye-products in carbonizing coal for the manufacture of coke; but a decrease in shale-works and iron-works more than balanced it. The decrease in shale-works is chiefly attributable to the stoppage of one works; the decrease in iron-works has accompanied a decrease in the production of pig iron, but in more than a proportionate degree. The ammonia recovered in Scotland per ton of pig iron produced was less last year than in 1899. Of the salts of ammonia produced in Scotland from all varieties of ammoniacal liquor, 97·3 per cent. was obtained by the aid of the continuous system. Gas liquor was distilled in 31 works; of these, 22 employed the continuous and 8 the intermittent form of still. In one instance both systems were in use. Three modes of dealing with noxious gases were employed: (1) Oxide of iron purifiers were used in 23 works, and dealt with 62·1 per cent. of the noxious gases liberated; (2) combustion was resorted to in 5 works, and dealt with 35·5 per cent. of the gases; and (3) decomposition of the sulphides in the liquor by chemical agents was used in 4 works, and dealt with 2·4 per cent. of the gases. The number of works in which tar was distilled last year was 45—a decrease of one. More than half of the pitch produced in Scotland comes from the tar recovered from blast-furnace gases. In most of the iron-works, the waste gases formed during the distillation of tar are led back to the furnace gases before these are treated for the recovery of tar and ammonia. In this way, any valuable substances are recovered; while the remainder passes off with the washed gases to be utilized as fuel. In the distillation of gas tar, lime purifiers are most frequently used for absorbing the waste gases produced. In a few cases oxide of iron purifiers are employed for the purpose. There were no prosecutions under the Acts in Scotland last year.

Mr. Carpenter furnishes some further analyses of ammoniacal liquors produced at shale-works. The distillation of shale is the source of more than half of the ammonia recovered in Scotland, and contributes more than one-sixth of the whole production in Great Britain and Ireland, as shown by the table already given (*ante*, p. 162). The analyses above referred to are contained in the following table:—

| Liquor. | Degrees Twaddel. | Chloride, calculated as HCl, per Cent. | Distribution of Sulphur (per Cent.). | | | | | | | Ammonia. | | | | Carbonic Acid. | | Sulphuretted Hydrogen. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | As Sulphate. | As Sulphocyanide. | As Thiosulphate. | As Polysulphide and other Forms (by Difference). | As Sulphide. | Total Sulphur per Cent. | Per Cent. Sulphur to Ammonia. | Total, per Cent. | Fixed, per Cent. | Free. A. Per Cent. | Free. A. H.E. | B. Per Cent. | B. H.E. | C. Per Cent. | C. H.E. | Total Acids (B + C); H.E. | Difference of Acids (B + C − A) H.E. | Difference of Acids (B + C − A. $NH_3$, H.E. = 100). | Per Cent. of Total Acids as $H_2S$. |
| Shale-Works. | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2·6 | 0·041 | 3·74 | 0·93 | 48·50 | − 2·98 | 49·81 | 0·1070 | 10·55 | 1·0140 | 0·0440 | 0·9700 | 57·06 | 1·1814 | 53·70 | 0·0566 | 3·33 | 57·03 | −0·03 | −0·05 | 5·8 |
| 2 | 3·0 | 0·079 | 8·03 | 2·29 | 54·59 | −13·76 | 48·85 | 0·0436 | 3·74 | 1·1660 | 0·0475 | 1·1185 | 65·80 | 1·4784 | 67·20 | 0·0226 | 1·33 | 68·53 | +2·73 | +4·15 | 1·9 |
| 3 | 4·6 | 0·027 | 6·87 | 0·46 | 46·57 | +16·51 | 29·59 | 0·1078 | 6·49 | 1·6610 | 0·0410 | 1·6200 | 95·30 | 2·0251 | 92·05 | 0·0336 | 1·99 | 94·04 | −1·26 | −1·32 | 2·1 |
| 4 | 3·0 | 0·010 | 2·45 | 1·47 | 20·45 | + 4·27 | 71·36 | 0·2039 | 16·10 | 1·2665 | 0·0425 | 1·2240 | 72·00 | 1·6137 | 73·35 | 0·1546 | 9·09 | 82·44 | +10·44 | +14·50 | 11·0 |

The Chief Inspector explains that No. 4 liquor was from a description of shale known to be especially high in its sulphur content. It will be noticed that the proportion of sulphur in the oxidized form in this liquor is much lower than in any other of the series. All these analyses are of liquors derived from the distillation of shale in retorts of modern type. There was considerable activity in some of the large shale-works last year in the way of remodelling the retort plant for distillation on modern and improved methods; one result looked for being an improved yield of ammonia over that obtainable by the old Pentland retort. Mr. Carpenter devoted in previous reports some attention to the great improvements in the prevention of the discharge of noxious and offensive gases which have resulted from the working of the modern retorts. In the latest form competing for adoption with others of excellent type, the principle of the combustion of the fixed carbon of the shale partly by steam and partly by air is adopted; a certain quantity of air being injected together with the vapours from the "cracker-boxes" (sulphate of ammonia saturators) into the lower portion or zone of the "producer" section of the retort.

There was an appreciable reduction in the amount of ammonia recovered from blast-furnace gases in Scotland last year; and in one development of the iron industry—the direct utilization of blast-furnace gases for the production of power by means of gas-engines of large dimensions—the country has not yet taken its due share. Mr. Carpenter remarks that this subject is acquiring increasing importance; and he points out, as a matter of interest, that the first experimental trial of ideas which have since had developments of such enormous and wide-reaching importance was made at the works of the Glasgow Iron and Steel Company at Wishaw in the early months of 1895, by Mr. J. Riley, then the Manager of this large industrial concern—the idea of such utilization being practicable having been put forward by Mr. B. H. Thwaite in the previous year. He says it may seem surprising that in Scotland, where the blast-furnace gases are in the best possible condition for use directly in the engines (being free from water vapour, dust, and tar, as far as the elaborate scrubbing plant of ammonia recovery can accomplish it), no forward step has as yet actually taken place. There can be little doubt, he thinks, that the considerations as to the regularity and duration of supply of the special quality of fuel used, which press more closely in Scotland than elsewhere, exercise a controlling and retarding influence on the expenditure of fresh capital on new methods, whatever economy may reasonably, and even confidently, be looked for by their adoption. One manufacturer, indeed, expressed the opinion to him that, if twenty years of activity were assured for the plant, capital would be found without hesitation when economy was assured. He judges, therefore, of the nature of the apprehensions which are felt as to the future of coal-fed blast-furnaces.

Other features in Mr Carpenter's interesting report may call for notice on some future occasion.

**Southport Water-Works Purchase.**—The Southport Town Council yesterday week considered in private the agreement with the Water Company for the purchase of their property; and in open Council the Mayor and Town Clerk were empowered to fix the corporate seal to the agreement.

**The Poverty of the Public Works Loan Board.**—The Clerk reported to the Winsford District Council last Wednesday that he had written to the Public Works Loan Board asking if they were willing to lend £1600 for gas-works purposes. The reply was that the Board were unable to entertain the application, having regard to the limited sum placed at their disposal by Parliament, and to the amount of loans already granted. The Council decided to advertise for a loan.

**Bradford Gas and Water Finances.**—The citizens of Bradford had their annual budget presented at a special meeting of the Corporation last Wednesday. In an address which occupied an hour in delivery, Alderman Ratcliffe, Chairman of the Finance and General Purposes Committee, dealt with the finances of the city. Referring to the gas and water works as commercial undertakings, he stated that, since the former were taken over, the amount appropriated out of the profits had been £457,026. In the year ending the 31st of March last, the trade profit was £42,664; being at the rate of 6·856 per cent. on the capital invested. The trade profit on the water-works was £121,446, or at the rate of 4·986 per cent. on the invested capital.

## EUROPEAN GAS COMPANY, LIMITED.

The Annual General Meeting of the Company was held on Monday, July 15, at the London Offices, Finsbury House, Blomfield Street, under the presidency of Mr. R. HESKETH JONES.

The SECRETARY AND GENERAL MANAGER (Mr. W. Williams) read the notice convening the meeting, and subsequently the following report of the Directors.

The Directors are again able to report an increase in the consumption of gas at the majority of the Company's stations. The loss of the public lighting at Amiens, to which allusion was made at the last meeting, has reduced the rental there by 18 per cent.; but the increase in the sale of gas at Boulogne, Caen, Havre, and Nantes more than compensates for this loss, and gives a net increase of 3 per cent. in the aggregate for the seven stations.

The revenue from coke has been exceedingly satisfactory, and, added to improved returns from tar and sulphate, has gone far to meet the increased cost of coal. The price of coal has now fallen considerably, and new contracts have been made on much more favourable terms than those of the previous year; but the old rates will continue in force during part of the current year, when it will not be possible to obtain the high prices for coke which were secured during the period under review.

The fluctuations in the market price of coal are generally accompanied by a rise or fall in the value of coke; and, under any circumstances, there is a constant tendency for prices to reach their normal level. Such fluctuations are in the ordinary nature of trade, and are sometimes to the advantage, as at others they are to the disadvantage, of gas companies. It is otherwise, however, with the new export duty on coal, which is a fixed charge, levied irrespective of any question of market value, not on all coal raised at the pit's mouth, but only on fuel shipped to foreign ports. As the Company have no power to increase the price of gas abroad, the burden of this tax must fall on the shareholders. The Board, acting in conjunction with the Directors of other English undertakings operating abroad under similar conditions, called the attention of the Chancellor of the Exchequer to the hardship which this new tax involved on the shareholders; but without avail.

Under these circumstances, the Directors propose that only the profits actually earned during the past year be distributed; and they recommend that the usual dividend be paid of 20s. per share on the fully-paid shares, and 15s. per share on those £7 10s. paid, less the interim dividend of 8s. and 6s. per share respectively paid on Feb. 1 last; also that a bonus of ½ per cent. (instead of 1 per cent. as in previous years) be paid on all shares according to the amount paid thereon, subject, however, to a deduction for French stamp and transfer duty of 1s. 1d. per fully-paid share and 10d. per share £7 10s. paid in respect of all shares held in France.

Notice has been given that two Directors (N. E. B. Garey, Esq., and Henry C. Smith, Esq.) and both Auditors (J. Reeson, Esq., and F. M. Fry, Esq.) retire from office at this meeting; but, all being eligible, they offer themselves for re-election.

The CHAIRMAN observed that it was his duty to point out the reasons why a somewhat reduced division of profits was recommended this year. His predecessor, their late friend Mr. Gill (whose death was announced in January) informed the shareholders at the last annual meeting that the price of coal had risen from 8s. to 15s. 4½d. per ton f.o.b. in the North. Owing, however, to the Company having stocks in store on March 31, 1900, and also undelivered cargoes at the old rates, the actual extra cost of coal for the past year had not been 7s. 4d. but 4s. 8d. per ton; the total extra cost being £30,485. During the past year, however, they had obtained the full benefit of the increased value of coke and other residuals, which showed an improved yield of £25,014, reducing the extra cost of coal to £5470. It might be asked, Why reduce the bonus from 1 to ½ per cent.? Why not take the deficiency from the accumulated profits? Unfortunately, the newly-imposed coal tax had to be thought of. The Company used about 120,000 tons of English coal in the course of twelve months; and the tax of 1s. per ton on this quantity amounted to £6000 per annum. This was equivalent to 16s. per cent. on their paid-up capital of three-quarters of a million; and, in addition, they had to meet the extra income-tax of about £800, which would be paid by the Company, and not deducted from the shareholders' dividends. This was equal to 2s. per cent. on the paid-up capital. Therefore, from March 31 last, the extra war taxation payable by the Company would amount to £6800 a year, or 18s. per cent. on the paid-up capital. Since March 31, they had paid £1931 in coal tax; and although there was the possibility of their claim for repayment of the tax on the quantity shipped under contracts made prior to the imposition of the tax being admitted by the Government, yet this would be only a partial relief, and would not affect coal subsequently purchased. This tax had been said to be levied on, and payable by, the foreigner; but it was not so in their case. Under the terms of their French concessions, they could not increase the selling price of gas; so that the shareholders of an English Company, the bulk of whom were English people, would have to bear the entire burden of the new tax, which, as he had already said, was equivalent to 16s. per cent. on the par value of their shares. Whether the bonus of 1s. per share now proposed to be paid would be maintained, it was difficult to say; but the Directors would, before meeting the shareholders next year, very carefully consider this. At the same time, it was as well to mention that they must not be disappointed if the bonus were swallowed up by increased taxation, and if to maintain the 10 per cent. dividend, the reserve fund had to be drawn on. The shareholders should bear in mind that a 10 per cent. dividend on which income-tax at 1s. 2d. in the pound was paid by the Company, was equal to £10 11s. 8d. per cent. irrespective of any bonus. In the past the Company had been most ably managed; and he could, as a new Director coming before the shareholders for the first time, unhesitatingly congratulate them on the present sound financial position resulting from able and judicious administration. With increasing business, one looked forward with confidence to the maintenance of the 10 per cent. dividend. The business of the Company was increasing. At Nantes, they had 8 per cent. increase, at Boulogne 7 per cent., at Caen 5¾ per cent., and at Havre 4¼ per cent. Rouen and Bolbec were stationary; while Amiens showed a decreased consumption due to the loss of the public lighting. This, however, was not a financial loss, as this part of their business in Amiens left them no profit at the best of times. Accompanied by Mr. Williams, he last May visited the Company's several stations. Although he had been a shareholder for 25 years, he had never while on the Continent (on the business of the Continental Union Gas Company) ventured to visit this Company's works until now; and he had been agreeably surprised to find that they possessed such valuable property. None of their works were cramped for room. At most of them there was surplus land and house property, some of which might be sold without detriment to the business. At all the works there was a good margin of plant capable of producing 25 to 40 per cent. more gas at a very trifling additional outlay. Their respective Managers were intelligent, painstaking, and devoted to the interests of the Company. He took the opportunity of making himself fairly well acquainted with the management and needs of each station. He had been much struck with the cultivation of the day consumption in Nantes, where great attention was given to the use of gas-engines; and, chiefly from this branch of the business, the day consumption there had risen to 42 per cent., which the Manager hoped eventually to raise to 50 per cent. The gas-engines were sold by the Company on short instalment payments, and were kept in repair by a special staff of workmen in their employ, at the cost of the gas consumer. The same remarks might in a more or less degree be applied to Havre and Caen. The day consumption last year was: At Nantes 42 per cent., Caen 40 per cent., Bolbec 37 per cent., Rouen 34 per cent., Havre 33 per cent., Amiens 31 per cent., and Boulogne 27 per cent., or an average for the seven stations of 35 per cent., against 32 per cent. last year. Day consumption was of more importance in French gas-works than in English, because taxation in France was based, not on structural value or business done, but on the capacity of the gasholders; and as day consumption needed but little, if any, storage—as the gas was used as made—it followed that there was a certain saving in capital outlay, and consequently less taxation on gas used in the daytime in France than on the night consumption. The Chairman last year alluded to negotiations for an extension of the concession at Amiens. These negotiations had been continued during the past year, in unison with the French Gas Company in the town; but up to the present time they had not arrived at a point on which the Directors could report. An extension of the concession would be accompanied by reduced selling prices of gas, which would adversely affect the profits of the Company until the increased consumption compensated for the reduced prices. He concluded by moving the adoption of the report and accounts.

Mr. N. E. B. GAREY seconded the motion, which was carried unanimously.

A resolution was afterwards passed declaring the dividend and bonus recommended.

On the motion of the CHAIRMAN, seconded by Mr. E. F. WHITE, the retiring Directors (Mr. N. E. B. Garey and Mr. H. C. Smith) were re-elected.

Mr. R. S. GARDINER afterwards proposed the re-election of the retiring Auditors (Mr. J. Reeson and Mr. F. M. Fry), remarking that the Company were to be congratulated on the admirable way in which the accounts, which were somewhat intricate, were kept.

Mr. H. E. JONES, in seconding the motion, incidentally congratulated the shareholders on the admirable account which the Chairman had given to the meeting on the value of the Company's properties abroad, a statement which he (the speaker) could confirm from his own observation. It was very gratifying that the progress of the day consumption had gone on so satisfactorily, and that it now amounted to 35 per cent. The advantage obtained from this was rather peculiar; the Company paying no extra taxation on the business, as the charge was levied on the gasholder capacity. He wished that companies in this country had the same advantage. He believed that the time was not far distant when the day consumption would reach 50 per cent.—indeed, he thought it would go higher. This was very satisfactory as compared with former times, when the day consumption was only about 15 per cent.

The motion was carried unanimously.

A vote of thanks to the Chairman and Directors was passed, on the proposition of Mr. JONES, seconded by Mr. H. D. ELLIS.

The CHAIRMAN, in acknowledging the vote, assured the shareholders that he felt the great responsibility of the position he now occupied—a position which he filled with the full concurrence of his colleagues. He was very pleased to say that they worked in perfect harmony with each other, a fact which foreshadowed the future prosperity of the Company.

A cordial vote of thanks to the staff at home and abroad was afterwards passed, and was acknowledged by the Secretary and General Manager.

The proceedings then terminated.

## ORIENTAL GAS COMPANY, LIMITED.

An Extraordinary General Meeting of this Company was held last Wednesday, at Finsbury House, Blomfield Street, E.C.—Mr. R. Hesketh Jones in the chair—for the purpose of confirming the resolution regarding the new regulations passed at the meeting held on the 26th ult. The Secretary (Mr. H. J. Luff) having read the notice convening the meeting, the Chairman moved, and Mr. H. D. Ellis seconded, the resolution adopting the new regulations to the exclusion of all existing regulations, whether expressed in the deed of settlement dated April 25, 1853, or in resolutions which have from time to time been passed since the formation of the Company, or otherwise. The motion was unanimously agreed to. The Chairman said he should like to mention, before the shareholders separated, that at the last meeting he stated that the Directors had received a cablegram from Calcutta to the effect that the Company had secured the contract for the public lighting. Since then the papers confirming the contract had come to hand, including the sanction of the Lieutenant-Governor, which was practically equivalent to an Act of Parliament; so that, for the next ten years, they were practically safe with reference to the public lighting. Regarding the new Articles of Association, some little delay would necessarily occur, because the Articles had to be registered at Somerset House. Then it was proposed to call an extraordinary special meeting of the shareholders (after the Long Vacation), towards the end of October, for the purpose of considering the propriety of rearranging the capital. If the resolutions were carried in October, they would come before an extraordinary general meeting of the shareholders in November, which would be held on the same day as the annual meeting. Then the affair

would be so far completed. The Directors had hoped they would have been able to do something that day; but it was necessary that the Articles should be registered at Somerset House. Hence the delay. This was all the business before the meeting.

## GAS MANUFACTURE IN DAYS OF SLAVERY.

An esteemed correspondent has sent us a copy of the "Times-Democrat" of New Orleans for the 24th ult., which contains some interesting particulars of the early history of the New Orleans Gas Company—the second oldest in America—especially during what are appropriately called the "cloudy and tempestuous days" of the early sixties in the South. Mr. Bankson Taylor, the Manager of the New Orleans Lighting Company, which is the modernized form of the old concern, when going through the books, found many curious entries which show the extent of the loss sustained by the Company during the Civil War, and give an idea of the financial vicissitudes of incorporated companies in the other old slave States. He says the money losses sustained by the Company through the emancipation proclamation of President Lincoln was $51,650. This amount represented the value of 62 slaves owned by them at the time of the occupation of New Orleans by the Federal forces. These slaves had been accumulated by the Company since 1835, or the year of the organization of the then New Orleans Gas Light and Banking Company. While the Company maintained a few slaves who were put to work about the station in 1836, the sweeping substitution of such labour for white labour was not made until 1848, as the following extract from the minutes of the monthly meeting held on the 6th of March of that year testify:—

A report from the Superintendent and Engineer of the Company, made at the suggestion of the President, upon the practicability of substituting slave labour for white labour at the station and on the street-mains, as well as for lighting the public lamps, was received and read, and, after discussion, the apparent economy of slave labour, from the estimate of the Engineer, determined the Board to authorize the Engineer to make the experiment. On motion, it was resolved—That the Engineer of the Company be authorized to purchase from time to time, as in his judgment he may deem advisable, with the sanction of the President, such slaves as will answer the purpose contemplated, either as stokers or labourers, as well as the necessary mechanics, to supply the place of the white labour now of necessity employed at so large an expenditure; and that the Treasurer be, and he is hereby, authorized to accept the acts of sale of such negroes, and pay for their cost.

From the time the order was issued, the Company, at various intervals, increased the number of their slaves to 62; but all were released by the proclamation of the President in 1863. The inventory of these slaves gave the name, the year bought, the present age, the cost price, and the present value. It is interesting to note how the value of a slave changed from year to year. For instance, one young fellow was bought for $1300, and his price in five years was marked down to $600, on account of some weakness. A slave and his wife were bought in 1836 for $2800, and in 1862 were valued at $900. Both had grown too old to do any appreciable amount of work for the Company, but their investment was not a bad one. The wife bore six children, who were given an aggregate value of $2900. As the slaves advanced in years, they were gradually marked down in value. For instance, one who cost his owners $1200 at the age of 43, was reckoned as being worth only $400 some 14 years after. On the other hand, the young slaves, as they matured, increased in value during the years they rendered good service to the Company. One man, when 29 years of age, was bought for $750; but at the date of President Lincoln's first proclamation of emancipation, he was valued at $1000. New Orleans was one of the localities exempted from the provisions of the first proclamation, which was issued on Sept. 22, 1862, to take effect on Jan. 1, 1863, and this accounts for the fact that the owners of slaves in the city held on to their human properties for a greater length of time than the slave-owners of the majority of the Southern States.

In addition to the slaves, there were other large items transferred to the profit and loss account of the ledger as the result of the war. The inventory showed Confederate notes on hand on June 1, 1862, amounting to $25,050, and assorted Confederate "shin-plasters" amounting to $8535. These assets disappeared from the books in the inventory of Jan. 1, 1865.

According to the minutes of the meetings of the Directors after the month of May, 1862, the President, Mr. P. N. Wood, was absent from the city. On his absence hangs a tale which is always a delightful one for the New Orleans inhabitants of the war period to remember. When Ben Butler came to town, in 1862, with the Federal forces, and sought to confiscate everything of value belonging to the sympathizers of the Southern cause, he did not forget to call upon the bankers for all the gold they had in their vaults. Butler seemed surprised to learn that all this gold had been shipped over the New Orleans, Jackson, and Great Northern Railroad (now the Illinois Central) to Camp Moore, the nearest Confederate post. The coin was taken from the city when the warning came that the Federal troops were about to make their entrance. Butler, not to be baffled in the confiscation of such an important item, at once called a meeting of all the bankers in New Orleans, and demanded that the gold should be returned to the banks. The bankers coincided with the General's views, and resolved that it was a rather unfair thing to do to put their money in the custody of the Confederates; and a resolution empowering Mr. Wood, the President of the Merchants' Bank, to go and get the coin, was passed. Then the town's risibilities were shaken. Mr. Wood went as he was directed, but he never came back. He kept close watch on that gold for a year, when he died in the Confederate camp. He had no intention of returning to the city with the money until it was beyond all danger of confiscation by Butler. It was all returned to the respective banks at the end of hostilities.

In recognition of 25 years of faithful service as Manager of the gas and water undertakings of the Ulverston District Council, Mr. John Swan has been granted an advance of £50 per annum in his salary.

## THE LONDON COUNTY COUNCIL AND SUBWAYS.

At the Meeting of the London County Council last Tuesday, there was some discussion on the report of the Highways Committee with regard to the laying of gas, water, and other pipes in the Council's subways. The position of the Council in regard to works carried out by water and other companies is, owing to the statutory powers possessed by them, not such as to enable the Council to protect the interests of the public in a way that is desirable, having regard to the widespread discontent that has lately been expressed at the manner in which important thoroughfares in London are opened by companies for their works without due regard to the necessities of the traffic. Mr. Howell J. Williams asked the Chairman of the Committee (Mr. J. Williams Benn) if, in view of the great inconvenience of opening the Thames Embankment by the New River Company for the purpose of laying their mains, an arrangement had been made whereby their licence to open the road compelled the Company to carry on their work night and day. Mr. Benn said he was not aware that the Council could compel the Company to work night and day. So far as his information went, the Company could do as they pleased with the Embankment. If his friend could direct him to any section of an Act of Parliament which would assist them in bringing about the result desired, he should be obliged to him. Mr. Williams asked whether it was not within the power of the Committee to refuse a licence, or to grant one on terms Could they not make it a condition of granting the licence that the Company should work night and day? Mr. Benn said not at all. They were served with a pencilled notice by some foreman that the Embankment would be opened from end to end. They obtained legal advice, and were informed that they could do nothing. Mr. Ratcliffe Cousins asked the Chairman whether the Committee were considering the question of the formation of subways on the Embankment and in the principal streets throughout London, and whether they had been in communication with the Post Office and the Gas and Water Companies as to what would be the terms of their contribution towards such subways. Mr. Burns asked whether there was not in the pavement abutting on the Embankment already a subway which many of these companies did not use. Mr. H. Ward inquired whether there was not a large subway in Queen Victoria Street which the Post Office were asked, and which they refused, to use; preferring to take up the whole of the street? Mr. Benn replied that the important question of subways had been dealt with from time to time, and was still under the consideration of the Committee. In reply to Mr. Burns and Mr. Ward, he might say they had the greatest difficulty in getting the Post Office and the companies to use the subways already in existence. Mr. Burns asked whether the Committee would consider the advisability of applying to Parliament for powers to make the companies go into the subways where they already exist. Mr. Benn replied that they would do so. The report was received.

## GLASGOW CORPORATION GAS COAL CONTRACTS.

### Discussion as to Procedure.

At the Meeting of the Glasgow Town Council last Thursday—Lord Provost CHISHOLM presiding—the minutes presented by the Gas Committee gave rise to a discussion on procedure in the matter of the coal contracts.

Mr. P. G. STEWART called attention to a paragraph in the minutes, from which it appeared that at a meeting of the Works Committee on the 26th ult. the tenders which had been received for the supply of coal during periods of four, eight, or twelve months from the 1st of July next were submitted; and that they were remitted to the Contracts Committee for consideration, and with power to accept the best offers. Mr. Stewart protested against this method of doing business. This was remitting to half-a-dozen gentlemen a sum of £350,000, with powers. He was himself a member of the Contracts Committee, and he thought it was impossible to expect gentlemen to go over some 90 offers, and do justice to them in the time at their disposal. It was said by Mr. Foulis that the offers had to be accepted within a certain time. Why was not the tender put into the public press, so that longer time would be available?

Bailie WILLOCK said Mr. Stewart was a member of the Contracts Committee, but he was not present at the meeting referred to in order to look after the interests of his constituents.

Bailie JOHN FERGUSON said he did not care to take part in any discussion which seemed to cast the slightest imputation of not acting fairly upon any Committee; and he was sure Mr. Stewart did not cast any such imputation. But that gentleman had brought before the Corporation a matter of very serious importance. The form of procedure certainly seemed to be wrong according to Mr. Stewart's statement. Half-a-dozen gentlemen spending an hour or two hours in going over 60 or 80 estimates was not enough, and these large contracts ought to be open for consideration by the whole Council.

Mr. PATON said he had been a member of the Committee since he came into the Council; and he was satisfied that there had been no abuse of their power. It was true that they were guided by Mr. Foulis; but he had special knowledge in regard to the matter which none of the members of the Committee possessed. He thought they had reason to congratulate themselves that the Committee had been able to buy coal this year at 9s. and 10s. per ton, compared with 15s. and 16s. a year ago.

Mr. FIFE protested against the remarks of Mr. Stewart.

Mr. STEWART: I wish to make a personal explanation. I could not be doing Corporation business in two places at the same time. I protested in the Gas Committee. I made no innuendo, but it is not straight business; it is not business at all.

Mr. FIFE said he was glad to hear the last observation of Mr. Stewart; but it was just a re-hash of some remarks he had made on a similar occasion last year.

Mr. PRIMROSE said he did not wish to criticize the action of the Gas Committee, as he believed they conscientiously discharged their duty.

But he should like to say that any question involving such contracts should be brought before the Corporation, to see whether they should be for four, eight, or twelve months. He would like to know the period for which the contracts were made.

A MEMBER: Twelve months.

Mr. PRIMROSE said he would have liked to dispute the policy of contracting for twelve months in face of a falling market.

Mr. SHAW MAXWELL contended that after the Contracts Committee had made their selection they should bring the contracts before the parent Committee, who should bring them before the Corporation.

Treasurer MURRAY said he understood the Contracts Committee had followed the same practice as they had done for many years. If any change was to be made in dealing with this matter, it ought to be done by formal notice of motion.

Mr. MAXWELL said it was against the Standing Orders.

Treasurer MURRAY said the Standing Orders did not affect this matter, inasmuch as it had been the invariable custom for many years for the Gas Committee to proceed upon the lines which had been approved by the Corporation. He held that the Committee had proceeded in the proper way.

Mr. MITCHELL, in reply, said the whole discussion was irregular, because the minutes dealing with the contracts were not before the Council. The Contracts Committee had accepted the contracts, in accordance with the custom of many years. This was done for the good reason that the offers were limited in time, and that there would be no opportunity of bringing them before the Council. As to contracting for short periods, the Committee asked for offers for four, eight, or twelve months, but the offers for four or eight months did not amount to anything like the quantity that would have carried them through the year; and as the offers for twelve months were more favourable, they thought it their duty to fix the supply at a moderate price for this period. But the time to discuss the position of the Gas Committee would be when the accounts came up for consideration. He did not look forward to submitting that statement with the same pleasure as in some former years; but he hoped they would find a more favourable condition of things when they came to deal with next year.

The minutes were approved.

## RAMSGATE CORPORATION GAS AND WATER SUPPLY.

### The Past Year's Working.

The accounts of the Gas and Water Departments of the Ramsgate Corporation for the year ending the 31st of March, were considered at a meeting of the Gas, Water, and Electricity Committee on Monday last week—the MAYOR (Alderman H. H. Green) in the chair.

The minutes of the previous meeting having been read and approved, the recommendations of the Accounts Committee were submitted; the resolution being as follows: "That the sum of £2445 10s. 8d. from the gas revenue account, and £731 13s. 8d. from the water revenue account, be paid to the district fund in aid of the rate to be made for the half year commencing the 30th of September, 1901."

Mr. C. J. GWYN, J.P., the Chairman of the Committee, then proceeded to make his report. He said that, in common with the whole of the gas industry of the kingdom, the Committee had felt the adverse operation of the abnormally high price of coal, which fortunately in their case did not take effect until the 29th of December. Short as the time had been, however, it was long enough to have a very marked effect upon the figures of the annual accounts. The coals received under the old contract lasted up till the 31st of October, and cost 11s. 9d. per ton; but from that date to the end of December they cost 13s. 9d. per ton, and from the beginning of this year 23s. 2d. per ton. So that the very dear coal had only come into charge for a quarter of a year. The effect upon the revenue account in arriving at the figure of gross profit would be seen at once. They had this year £8927, against £10,632 last year. The amount absorbed by the increased price of coal was £3397, which would have raised the gross profit to £12,324. The additional quantity of coal carbonized in the past year was 1305 tons. A considerable part of this had been due to the extra consumption of gas in the Minster district, which had risen from £776, in round figures, in 1900, to £1036 in 1901. There could, therefore, be no doubt that the advantage of maintaining the price of gas at the low figure of 2s. 8d. and 3s. 8d. per 1000 cubic feet had manifested itself, not only in the augmented consumption which had taken place in the Ramsgate district, but also in the new district of Minster. Under the head of "Manufacture of gas," the repair and maintenance of works and plant had cost about £800 more than in the previous year. The charge of £2909 under the head of "Distribution of gas" showed an increase of £719, divided between the increased cost of repairing main-pipes, due in a great measure to the operations of the Light Railway Company, and repairing, renewing, and refixing stoves. The latter item was now a considerable one, and one from which they derived substantial profit, as testified by the continually increasing amount received on account of the sale of gas for other purposes than lighting. The amount obtained for residuals had risen from £8497 to £11,284. This was due principally, if not entirely, to the higher price received for coke. The make of gas last year exceeded that of the year 1899-1900 by 8,316,000 cubic feet (equal to an increase of 3·79 per cent.), of which 5,875,000 cubic feet had been sold within the Minster district. The total make for the year had been 227,622,000 cubic feet, including Minster. Without that place, it would have been 221,747,000 cubic feet; showing an increase of 3·25 per cent. for Ramsgate only. The net result of the year's working, after paying dividend, interest, income-tax, and all other charges against the revenue, was £2445 10s. 8d. to which had to be added the balance carried forward; making the net available profit to be dealt with £4945 10s. 8d. The works (under Mr. W. A. Valon) had been well kept, and were in efficient condition. When the expenditure on the new retort-house had been completed, the borrowing powers of the Corporation under their last Provisional Order for gas purposes would have become exhausted; rendering it necessary to apply for a further Order for raising capital, which would be required, among other things, for the substitution of larger purifiers to deal with the increased make of gas—marking the last item in the list of improvements and extensions decided upon by the Committee, all of which, as past experience justified them in saying, would be self-supporting, and would increase the revenue of the Corporation. The revenue account of the water undertaking showed that the income from the sale of water, &c., had increased to the extent of £606, and that this amount had been absorbed by charges on the other side of the account. The total result was a net profit of £731 13s. 8d. for the year. This was less than this time last year, and was due to the fact that the charge for interest on loans had increased by about £250. Dealing with the year's profit, and looking at the fact that, with reference to the Gas Department, coal would cost in the present working year £1814 more than was expended last year, which returned a net profit of £2445 10s. 8d., and with the certainty that residuals would yield a greatly lessened amount, the question of the disposal of the balance in hand needed careful consideration, especially as he felt the Committee were anxious to avoid any increase in the price of gas. It would probably be safe to recommend that the amount of the net profit should be paid over from that department to the district fund, in aid of the winter rate; leaving £2500 to set against the items just mentioned. If the Committee followed out the practice of previous years, which, as he had always said, he felt to be a pernicious one—viz., to utilize for rate purposes the whole of the water profits—the total amount available for such purposes would be: Gas, £2445 10s. 8d.; water, £731 13s. 8d.—total, £3177 4s. 4d. Last year the figures were: Gas, £2214 8s. 6d.; water, £1015 7s. 4d.—total, £3229 15s. 10d. The amounts handed over in aid of the rates for the past three years had been as nearly similar as could be; being this year £50 less than last, and that year being about £50 more than the previous one—each year having contributed more than £3000 in relief of the rates. The Accountant had abstracted for him the following figures dealing with the sums expended for coal. If the coal carbonized this year, amounting to 20,128 tons, had been bought at the old contract price of 11s. 9d. per ton, the total expenditure would have been £11,825 4s. It actually cost, however, £15,222 5s. 1d.; and the amount the coal would stand at this year would be £17,036 10s. 6d. So that the expenditure under this item would be something like £5200 more than that of three years ago. Having kept the price of gas at 2s. 8d. per 1000 cubic feet, and still being able to show a profit, he hoped the Committee would consider they had not had a bad year's working. He could not find in the "JOURNAL OF GAS LIGHTING" that any other works were taking a rise out of them with regard to the operation of their undertakings. He moved the adoption of the report.

Mr. BANNISTER seconded the motion.

Mr. GWYN, replying to Alderman Bradley, said that nothing would be more unpopular than raising the price of gas. Every owner of property had told him the same story—that the first or second question asked by persons intending to take a house was: "What is the price of gas?" and it was the cheapness of gas in Ramsgate which was a great factor in inducing people to take houses.

Mr. BEAR said he had no particular fault to find with regard to the accounts, but considered the best policy would be to raise the price of gas in view of the increased cost of fuel and the probability that the residuals would not produce so large an amount as before.

The recommendation of the Committee was then put and carried.

## LEIGH GAS AND WATER AFFAIRS.

The Leigh Town Council had before them last Tuesday the annual report of the Gas Engineer, which showed that during the past year 6 miles and 1610 yards of new gas-mains were laid, and that the total length was now 43 miles 664 yards, 2 miles 667 yards of which had been laid in Golborne. Owing to the Corporation being unsuccessful in their appeal to the House of Lords against the Golborne Gas Company's Bill, these will now have to be taken up. The number of consumers at the end of the year was 3015 by ordinary meters and 2507 by prepayment meters; making a total of 5522, or 341 more than in the previous year. The number of stoves fixed at the end of the year was 1675—an increase of 475 in the year. There were also 700 grillers in use. The gas consumed during the year amounted to 131,262,265 cubic feet—an increase on the preceding year of 4,189,365, or 3·29 per cent. This was satisfactory, considering the mildness of last winter and the loss of customers who had adopted electric lighting. The gross profit amounted to £7481, which was equal to 5·29 per cent. on the capital employed. The Water Manager's annual report showed that the total length of mains laid was 26 miles 1412 yards. The total quantity of water received during the year from the Liverpool Corporation was 134,125,000 gallons; being 6,831,000 gallons more than last year. The average yield to the water-rental was 1s. 0·32d. per 1000 gallons. The consumption per head per day was 7·03 gallons. The Engineer reported that he was considering a scheme for an additional supply of water to the borough in conjunction with the Chief Water Engineer to the Liverpool Corporation; and he hoped at an early date to lay the scheme before the Sub-Committee appointed to deal with the matter. The reports were adopted.

**Public Lighting at East Molesey.**—Mr. H. E. Parker, a resident at East Molesey, has been endeavouring to ascertain the views of the ratepayers on the subject of the public lighting of the district, with the object, if possible, of effecting improvement. He accordingly circulated a card containing the following question: "Are you in favour of incandescent gas to be supplied by Michaelmas next, or the more costly electric light possibly installed by September, 1902, after consent of Parliament has been obtained?" The replies received were: In favour of incandescent gas, 113; in favour of electric light, 30; satisfied with the oil-lamps, 11. Some of the replies were too vague to be classified. Those given, however, show a very substantial majority in favour of incandescent gas.

## LONG EATON GAS-WORKS PURCHASE.

At the Meeting of the Long Eaton District Council on Monday last week, Mr. Winfield, who was one of the members deputed to visit Westminster in connection with the Gas Company's Bill, made his report. He stated that, in his opinion, it would be advisable for the town to purchase the works provided it could be done at a reasonable figure. The report to them by the Clerk and Surveyor showed a great difference in the basis of purchase, stretching from £76,000 to £121,000. Of course, if they agreed to purchase the works, they would have to abide by the decision of the arbitrator, which could go up to £150,000, He could not vote for purchase at whatever value an arbitrator might put upon the works; but if the Company would sell at a reasonable figure, there was no reason why the Council should not purchase. The Chairman said he was far from sanguine that a satisfactory arrangement would be arrived at with the Company; and the best plan would be to run the risk of arbitration. All the places set forth in the report as having purchased gas-works showed that a profit had been made. Mr. Wallis did not think that Long Eaton was on all-fours with the towns mentioned in the report. Suppose all the factories went in for the electric light, how would they be able to make the gas-works pay? Schemes were going on for the electric light; and no doubt the factories would not be satisfied with gas much longer, though at present they made up a large proportion of the income of the Company. It was a serious question for Long Eaton to buy the gas-works at a fanciful price. The Chairman said Long Eaton was a growing place; and more trouble would arise as to lighting the town. It was stated that the probable cost of an Act of Parliament would be from £800 to £2000. Mr. Syson remarked that, in the face of consumers putting in the electric light, he did not think the gas-works worth two-thirds the amount asked for. What would they do if large consumers were to introduce the electric light? Mr. Winfield did not think members should get their backs up at the probable expenditure of £150,000. (Laughter.) In the face of the enormous price, he hesitated to leave himself in the hands of an arbitrator. Mr. Maskell observed that the Directors and shareholders of the Company were not prepared to enter into any scheme for selling by private negotiation. At the time the Bill was passed, Mr. Winfield said it was now or never for the purchase of the works. If on the basis of private negotiation, he was sure it was "never." The Company would not sell, except by compulsion. Mr. Chester said, if the Council went in for electric light, the gas question should stand over; but if the electric scheme was abandoned, he was prepared to go in for the purchase of the gas-works. Mr. Winfield said they could not have both schemes. Various resolutions were then proposed; but the only suggestion which found favour with the Council was one in which they modestly declared that they could not see their way to purchase the works by compulsion. Their next step will be to decide whether they will proceed with the electric lighting scheme.

## WEST BROMWICH GAS UNDERTAKING.

### Success of the Prepayment Meter System.

The annual report of the West Bromwich Gas Undertaking, for the year ending March 31 last, was issued on Friday by the Secretary (Mr. T. Hudson). It states that the borrowing powers remain the same as at the end of the previous year—viz., £266,185 7s.—and the loan indebtedness at the end of the year was £180,441 7s. 9d., against £182,441 7s. 9d. at the commencement. The capital expenditure was increased during the year to the extent of £3159 11s. 4d., and now stands at an average of 13s. 4d. per 1000 cubic feet of gas sold. The sales of gas have increased at a satisfactory rate, although not in the same ratio as the two preceding years. In the prepayment meter class, the increase is again gratifying—being 16½ per cent.—while the increase in the sales of gas for motive power purposes amounts to 35 per cent. over the previous year; but the consumption in the case of the ordinary consumers has been practically stationary. The income from gas sold last year was £3314 2s. 8d. in excess of the previous year, of which about £1350 represents the value of the enhanced prices for gas ruling from Oct. 1 to March 31. The income from prepayment meters was £8032 0s. 9d. in bronze coin, weighing nearly 18 tons—a substantial increase over the previous year. The total number of consumers of all kinds at the end of the financial year was 10,142—an addition of 474. The total quantity of gas used by private persons and for public lighting was 309,410,770 cubic feet—an increase of 13,535,800 cubic feet, or 4·57 per cent., over the previous year. The quantity of gas lost by leakage and condensation was 14,287,230 cubic feet. The aggregate income from residual products shows a substantial increase of £346 17s. 5d. from tar and £4332 2s. 1d. from coke; while ammoniacal liquor shows a decrease of £214 12s. 8d. The total income from all sources is £63,477 14s. 9d., compared with £54,279 3s. 10d. in the year 1899-1900—an increase of £9198 10s. 11d. The total expenditure on the trading account is £50,201 16s. 6d., against £40,955 10s. 2d. before—an increase of £9246 6s. 4d. The total manufacturing charges exceed those of the previous year by £8225 12s. 8d., due chiefly to the higher prices paid for coal and fuel throughout the greater part of the year, as well as to the heavier cost of maintenance and repairs of plant. The quantity of coal carbonized was 29,450 tons, and of gas made 327,468,000 cubic feet—an increase of 14,630,000 cubic feet. The cost of public lighting, exclusive of gas, was £992 16s. 7d.; and the gross profit on the trading account, or the balance of income over expenditure, is £13,275 18s. 3d., against £13,323 13s. 8d.—a decrease of £47 15s. 5d. The actual surplus is £4513 17s. 7d., against £4472 17s. 4d., or £41 0s. 3d. more. The outstanding balance on the depreciation and suspense fund account at the end of the year was £20,480 7s. 8d.; and the total outlay on the prepayment meter account to the 31st of March last is £21,036 10s. 4d. The number of consumers served through ordinary meters last year was 4591, while 5250 were supplied by means of prepayment meters.

## FINANCES OF THE SMETHWICK GAS DEPARTMENT.

At the Meeting of the Smethwick Corporation last Tuesday, the Secretary of the Gas Department (Mr. W. J. Sturges) presented his report on the working for the fifteen months ending the 31st of March. He explained, at the outset, that the accounts had hitherto been made up to the 31st of December in each year; but as the financial year of the borough ended on the 31st of March, the Committee considered it desirable to bring the accounts into uniformity therewith. The expenditure on capital account during the above-named period amounted to £3411 17s. 2d.; being £1079 for new mains and £2308 for new meters. The sale of gas showed a satisfactory development; the income amounting to £46,500. The quantity of gas sold was 364,772,900 cubic feet; compared with 339,504,700 cubic feet for the fifteen months ended March 31, 1900. The number of meters fixed and in use on the 31st of March last was 4860; being an increase of 88 ordinary and 691 prepayment meters. The amount received from the latter was £3753 18s. 8d.; and the number fixed at the close of the period covered by the accounts was 1811. The quantity of gas sold through prepayment meters was 22,523,600 cubic feet, compared with 13,216,600 cubic feet for the corresponding period ending March 31, 1900; and the gas supplied for motive power was 26,936,700 cubic feet for 1901, and 22,347,300 cubic feet for 1900. In consequence of the enormous advance (more than 5s. per ton) in the contract prices of coal purchased in June last year, the charge for gas was raised 3d. per 1000 cubic feet to all consumers, with the exception of those using prepayment meters; while no increase was made for public lighting. The amount of additional revenue due to the extra 3d. was £2400. The income from residual products amounted to £17,553, or 9s. 8·573d. per ton of coal carbonized, against 7s. 4·003d. per ton for the year 1899—an increase of 2s. 4·57d. per ton, or equal to £4302 on the 36,139 tons carbonized, and due almost entirely to the higher values obtained for coke, the net price realized being 5s. 1d. per ton in excess of that obtained in the year 1899. The total income from all sources amounted to £64,223. The total cost of gas manufacture during the fifteen months was £39,674, or 21s. 11·477d. per ton of coal carbonized, against 16s. 10·335d. per ton for 1899. The average price of coal used during the fifteen months was 4s. 7½d. per ton above that for 1899, and amounted on the total quantity carbonized to an increase of £8357, towards which sum the Committee asked from the consumers the modest contribution of £2400. The cost of purification was 1·483d. per ton higher, wages were 2·633d. per ton higher, and repairs 1·816d. per ton higher than in 1899. The distribution charges amounted to £4078, working out to 2·683d. per 1000 cubic feet of gas sold, which was 0·692d. more than in 1899. This on the 364,772,900 cubic feet sold during the fifteen months represented an increase of £1051. The total expenditure was £47,667, and the cost per 1000 cubic feet of gas sold worked out to 2s. 7·363d., compared with 2s. 2·662d. for 1899. The gross profit, after providing substantial reserves, amounted to £16,555. A balance of £7582 was brought forward, out of which £2000 was transferred to the district rate account and £600 to the depreciation fund account; leaving in hand £4982, to which was added the gross profit of £16,555. After providing interest on loans and sinking fund charges, there remained a net profit of £6441, which, with the balance brought forward, and after providing the 1901 contribution of £2000 to the district rate, left £9423 in hand for working capital. The report was adopted.

## PORTSMOUTH CORPORATION AND THE WATER-WORKS.

At the Meeting of the Portsmouth Town Council on Monday last week, the subject of the purchase of the works of the Portsmouth Water Company was again under consideration. The matter had been entrusted to a Committee, who submitted a report thereon.

Mr. H. R. Pink, in moving the adoption of the report, said that in 1898 a resolution was brought forward which, if it had passed, would have enabled the Council to purchase the water-works; but the matter dropped, and the negotiations were not re-opened until the present year. The arrangements now proposed were almost identical with those of 1898. This would be the last opportunity the Council would have of purchasing, for additional works were proposed by the Company, which would necessitate an increase of the capital; and when once this took place, he did not think the Corporation would be able to purchase so as to make the concern remunerative. If, however, they took courage on the present occasion, he was convinced that ultimately there would be a profit. When it was suggested to purchase in 1898, the idea was to exchange Corporation stock for the Company's shares. It was now proposed to do the same, and to create sufficient stock to produce the dividends now payable to the shareholders, as well as to compensate the Directors and Auditors. This meant that stock to the value of £1,246,329 would have to be raised. They proposed to take over the Company's reserve fund, now invested in Consols, and to pay the shareholders the actuarial value of their back dividends. It was also proposed to take over the whole of the staff, at the same remuneration as at present, and to pay the Directors nine years' fees. Of course, the important part of the question was: Could the purchase be made without loss to the borough? If the members examined the figures, they would find that the whole concern would be merely transferred to the ratepayers, a Committee of the Council taking the place of the present Directors. The business would go on just as it did now; the only alteration being that a Committee of the Council, who would do the work for nothing, would take the place of the Board of the Company. They would not have Directors' fees to pay; but there would be a large sinking fund, which, in 1903—the first year the Council would own the water-works—would amount to £3864. To this must be added charges incidental to a sinking fund and interest on the compensation fund, which would make together £5000 to be provided yearly more than at present the Company had to find. But from this £5000 they ought to deduct the Directors' fees at present paid; leaving a net sum of £4000 to be found. The excess of revenue made by the Company over and

above their powers to pay in dividends showed for 1896 a sum of £3456; in 1897, £2322; in 1898, £2967; in 1899, £2113; and in 1900, £3724. The business of the Company showed by figures given about £2000 increase in revenue each year. But with the large additions made to the assessment of the borough this year, the increase would be much more than the average; and as the assessments were likely to continue, the revenue would also rise. In 1923, the first year of the Corporation's ownership, the increase of revenue would be £2200; in 1904, it would be £2800; in 1905, £3600; in 1906, £4200—against a charge of £4000 each year. So that in the four years there would be a surplus of £12,800, against the charge of £16,000. But there was a balance at the bank, which would be handed over to the Corporation, and which stood at £11,000. This would be available to assist the sinking fund; so that at the end of 1906 there would be sufficient revenue for the Corporation to pay their way, and, after making up the deficiency of the first four years, leave about £8000 for contingencies. These calculations allowed for £10,000 rise in capital each year, whereas the Company's annual increase of mains for new districts was only about £3000. The average for the last few years had amounted to as much as £10,000; but this was chiefly owing to the Company having purchased land and works so as to secure the purity of the water and for diverting the Hermitage stream. The Company were now installing new engines and boilers, and other works were being executed; so that the Corporation would take the whole concern over in thorough working order, and would have nothing to provide except the new Admiralty main. He pointed out that they must not forget the fact that money paid into the sinking fund was not loss, but cash paid for the business; and each year £4000 would be paid off the capital charge of purchase. He would, however, again remind the Council that unless the purchase was made now, the whole project would have to be abandoned.

Mr. W. Ash briefly seconded the motion.

Mr. Murtough supported it. He said that, after consideration of the proposal for many years, he had come to the conclusion that it was the duty of the town to purchase the water undertaking. Portsmouth, it should be remembered, had shown a more rapid increase in population than any other place on the south coast, and an increase with which few British towns could compare. The £14,000 excess would safeguard the town against any serious loss.

After some discussion, it was decided that the report should be withdrawn to allow time for further consideration, and be brought up again at a meeting to be held a fortnight later.

**Batley Corporation Gas Supply.**—In connection with the Batley Corporation gas undertaking, the total income last year amounted to £27,472, and the expenditure to £18,451; leaving a gross profit of £9621. Out of the latter amount, £6328 goes to the sinking fund and interest account, £2000 to the relief of the rates, and £694 to the contingency fund. Coal, including cartage, and storage, cost £10,837, compared with £7889 for the previous year—an increase of £2948.

## NOTES FROM SCOTLAND.

### From Our Own Correspondent.

*Saturday.*

Next Thursday will see the North British Association of Gas Managers again in session. As the Association is now forty years old, it is entitled to the designation "venerable." Nor is the title an empty one, for many have reason to venerate the recollections of meetings of the Association at which they derived so much benefit. This year's gathering will possess a memory quite distinct from that of ordinary years, in that the Exhibition in Glasgow will be the point of attraction. There will be a good presidential address by Mr. Herring; but after that the programme which has been issued does not offer much food for discussion. It is in the galleries of the Exhibition that those who have eyes to see will learn things which it will be next to impossible to convey to their understandings by the medium of language alone. By the way, there are great complaints that the heating and lighting section of the Exhibition has been placed in a very out-of-the-way corner. The authorities seem to have regarded the subjects of heating and lighting as so extremely sectional, that only those who are interested would care to see the exhibits in that class, and that those who were interested would find out the section, wherever it were placed. A very foolish notion, surely, seeing that the existence of everyone is dependent upon the control of light and heat. The suggestion is made that direction-boards should be erected in the grounds, to guide visitors to the place. This is a good suggestion, but it need not be confined to this section alone.

The long discussion in the Glasgow Town Council this week upon the question of the coal contracts for the gas-works * is a further indication that the Municipality of the great Scottish city is rather on the down-grade. There used to be a magnanimous acceptance of the belief that all that was done by the municipal fathers was for the best of the city; but that faith in each other's uprightness seems to be in the process of vanishing. And this state of matters is being brought about, not because of anything which has been discovered amiss—for such a thing has not existed at any time—but by the application of crude theories of business, based upon abstract generalities or philosophic doctrines, which are very different from the requirements of every-day life. See how the application of the puritanical general doctrine which was preached by the minority would work. The Council are to be consulted as to the different classes of coal to be bought, from whom they are to be bought, and the prices to be paid. What a maelstrom of intrigue might, and probably would, arise in the carrying through of such a process; and, in the whirl of excitement, it is safe to say that the city would not benefit, but that the successful offerers would. It is doubtless matter of chagrin in some quarters that the quotations by offerers cannot be got at; but when the great responsibility which rests on those who conduct the business of the Gas Department

* A report of the discussion will be found on p. 226.

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 205.**

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | GAS COMPANIES. | | | £ s. d. |
| 590,000 | 10 | Apl. 12 | 10½ | Alliance & Dublin 10 p.c. | 18½—19½ | .. | 5 7 8 |
| 100,000 | 10 | ,, | 7½ | Do. 7 p.c. | 13—14 | .. | 5 7 2 |
| 300,000 | 100 | July 1 | 5 | Australian 5 p.c. Deb. . | 100—102 | .. | 4 18 0 |
| 200,000 | 5 | May 15 | 6½ | Bombay, Ltd. . . . | 6—6⅜ | .. | 5 0 0 |
| 40,000 | 5 | ,, | 6½ | Do. New, £4 paid | 4¼—4⅜ | .. | 5 9 5 |
| 380,000 | Stk. | Feb. 14 | 12 | Brentford Consolidated | 260—265 | .. | 4 10 7 |
| 270,000 | ,, | ,, | 9 | Do. New . . . | 190—195 | .. | 4 12 4 |
| 50,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 128—132 | .. | 3 15 9 |
| 159,375 | ,, | June 14 | 4 | Do. 4 p.c. Deb. . | 111—114 | .. | 3 10 2 |
| 220,000 | Stk. | Mar. 14 | 10 | Brighton & Hove Orig. | 222—227 | .. | 4 8 1 |
| 226,320 | ,, | ,, | 7 | Do. A. Ord. Stk. . | 155—160 | .. | 4 7 6 |
| 1,022,500 | Stk. | Feb. 27 | 5 | Bristol, 5 p.c. max. . | 121—123 | .. | 4 1 4 |
| 420,000 | 20 | Mar. 28 | 10 | British. . . . . | 41—42 | .. | 4 15 3 |
| 50,000 | 10 | Feb. 28 | 12 | Bromley, Ord. 10 p.c. . | 24—26 | .. | 4 12 4 |
| 79,000 | 10 | ,, | 9 | Do. 7 p.c. . . . | 19—21 | .. | 4 5 8 |
| 500,000 | 10 | May 31 | 6 | Buenos Ayres (New) Ltd. | 8½—9½ | .. | 6 6 4 |
| 220,000 | Stk. | June 28 | 4 | Do. 4 p.c. Deb. | 94—97 | .. | 4 2 6 |
| 150,000 | 20 | July 17 | 8½ | Cagliari, Ltd. . . . | 22—24* | +½ | 6 17 6 |
| 100,000 | 10 | May 31 | 10 | Cape Town & Dis., Ltd. | 15—16 | .. | 6 5 0 |
| 50,000 | 50 | May 2 | 6 | Do. 6 p.c. 1st Mort. | 52—54 | .. | 5 11 1 |
| 550,000 | Stk. | Apl. 12 | 12 | Commercial Old Stock | 270—280 | .. | 4 5 9 |
| 236,425 | ,, | ,, | 9 | Do. New do. . | 205—210 | .. | 4 5 9 |
| 238,237 | ,, | June 14 | 4½ | Do. 4½ p.c. Deb. | 128—133 | .. | 3 7 8 |
| 800,000 | Stk. | May 31 | 9 | Continental Union, Ltd. | 160—165 | .. | 5 9 1 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 160—165 | .. | 4 4 10 |
| 575,000 | Stk. | Feb. 28 | 5 | Crystal Palace Ord. 5 p.c. | 120—125 | .. | 4 0 0 |
| 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | 125—130 | .. | 3 16 11 |
| 486,090 | 10 | July 17 | 10½ | European, Ltd. . . . | 19—20* | .. | 5 5 0 |
| 354,060 | 10 | ,, | 10½ | Do. £7 10s. paid | 14—15* | .. | 5 5 0 |
| 15,079,885 | Stk. | Feb. 14 | 4 7/10 | Gas-light and Coke { 4 p.c. Ord. . . | 94—96 | .. | 4 11 8 |
| 2,600,000 | ,, | ,, | 3½ | 3½ p.c. max. . | 90—92 | .. | 3 16 1 |
| 3,799,735 | ,, | ,, | 4 | 4 p.c. Con. Pref. | 109—112 | +1 | 3 11 5 |
| 4,063,425 | ,, | June 14 | 3 | 3 p.c. Con. Deb. | 91—93 | −1 | 3 4 6 |
| 70,000 | 10 | May 31 | 8 | Hongkong & China, Ltd. | 13—14 | .. | 5 14 4 |
| 3,800,000 | Stk. | May 15 | 10 | Imperial Continental . | 207—210 | .. | 4 15 3 |
| 473,600 | Stk. | Feb. 14 | 3½ | Do. 3½ p.c. Deb. Red. | 100—102 | .. | 3 8 8 |
| 561,000 | Stk. | Feb. 28 | 10 | Liverpool United A | 235—237 | .. | 4 4 5 |
| 678,100 | ,, | ,, | 7 | Do. do. B | 172—176 | .. | 3 19 7 |
| 306,083 | ,, | June 28 | 4 | Do. do. Deb. Stk. | 118—120 | .. | 3 6 8 |
| 75,000 | 5 | June 14 | 4 | Malta & Medn., Ltd. . | 4½—5 | .. | 4 0 0 |
| 560,000 | 100 | Apl. 1 | 5 | Met. of { 5 p.c. Deb. | 105—108 | .. | 4 12 7 |
| 250,000 | 100 | ,, | 4½ | Melbourne { 4½ p.c. Deb. | 103—105 | .. | 4 5 9 |
| 541,920 | 20 | May 31 | 3½ | Monte Video, Ltd. . . | 9—10 | .. | 7 0 0 |
| 717,946 | Stk. | Feb. 22 | 8½ | Newc'tle & G'tesh'd Con. | 230—231 | .. | 3 13 7 |
| 312,855 | Stk. | June 28 | 3½ | Do. 3½ p.c. Deb. | 97—99 | .. | 3 10 8 |
| 150,000 | 5 | May 15 | 8 | Oriental, Ltd. . . . | 7⅛—7⅜ | +⅛ | 5 3 3 |
| 135,900 | 5 | ,, | 8 | Do. New, £4 10s. pd. | 6½—6⅝ | +¼ | 5 6 8 |
| 15,000 | 5 | ,, | 8 | Do. do. 1879, £1 pd. | 1⅛—1⅜ *Ex. div. | .. | 4 11 5 |

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | GAS COMPANIES. | | | £ s. d. |
| 60,000 | 5 | Feb. 28 | 7 | Ottoman, Ltd. . . . | 5⅝—6⅛ | .. | 5 12 0 |
| 851,070 | 10 | Apl. 26 | 7 | River Plate Ord. . . | 10¾—11⅛ | .. | 6 4 5 |
| 250,000 | Stk. | June 28 | 4 | Do. 4 p.c. Deb. . | 96—98 | .. | 4 1 8 |
| 250,000 | 10 | Mar. 28 | 8 | San Paulo, Ltd. . . . | 10½—11⅛ | .. | 6 19 1 |
| 135,000 | Stk. | Mar. 14 | 10 | Sheffield A . . . . | 235—240 | .. | 4 3 4 |
| 209,984 | ,, | ,, | 10 | Do. B . . . . | 235—240 | .. | 4 3 4 |
| 523,498 | ,, | ,, | 10 | Do. C . . . . | 235—240 | .. | 4 3 4 |
| 5,761,885 | Stk. | Feb. 14 | 5 | South Met., 4 p.c. Ord. | 125—127 | .. | 3 18 8 |
| 1,547,965 | ,, | July 17 | 3 | Do. 3 p.c. Deb. . . | 91—94* | .. | 3 3 10 |
| 380,940 | Stk. | May 15 | 5 | Southampton Ord. . . | 106—111 | .. | 4 10 1 |
| 70,825 | ,, | July 17 | 4 | Do. 4 p.c. Deb. | 104—109* | +1 | 3 15 5 |
| 120,000 | Stk. | Feb. 28 | 6 | Tottenham and Edmonton { A. 5 p.c. | 115—120 | .. | 5 0 0 |
| 250,520 | ,, | ,, | 4½ | B. 3½ p.c. | 85—90 | .. | 5 0 0 |
| 182,380 | 10 | Jan. 16 | 5 | Tuscan, Ltd. . . . . | 8—9 | .. | 5 11 1 |
| 149,900 | 10 | July 1 | 5 | Do. 5 p.c. Deb. Red. | 95—100 | .. | 5 0 0 |
| 230,000 | 5 | Feb. 28 | 9 | West Ham, 10 p.c. . . | 9—10 | .. | 4 10 0 |
| 147,000 | 10 | ,, | 6 | Do. 7 p.c. . . | 11½—12½ | .. | 4 16 0 |
| 128,984 | Stk. | June 28 | 4 | Do. 4 p.c. Deb | 103—108 | .. | 3 14 1 |
| | | | | WATER COMPANIES. | | | |
| 780,599 | Stk. | June 28 | 11 | Chelsea, Ord. . . . | 285—290 | .. | 3 15 10 |
| 150,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 153—158 | .. | 3 3 3 |
| 160,000 | ,, | ,, | 4½ | Do. 4½ p.c. Pref. '75 | 137—140 | .. | 3 4 4 |
| 175,785 | ,, | Mar. 28 | 4½ | Do. 4½ p.c. Deb. . | 140—145 | .. | 3 2 1 |
| 1,720,560 | Stk. | Apl. 12 | 7 | East London, Ord.. . | 187—192 | −1 | 3 12 11 |
| 654,740 | ,, | June 14 | 4½ | Do. 4½ p.c. Deb. . | 143—148 | .. | 3 0 10 |
| 980,169 | ,, | ,, | 3 | Do. 3 p.c. Deb. . | 94—96 | .. | 3 2 6 |
| 700,000 | 50 | June 14 | 8 | Grand Junction { 10 p.c. max.. | 102—105 | .. | 3 16 2 |
| 310,000 | Stk. | Mar. 28 | 4 | 4 p.c. Deb.. | 123—127 | .. | 3 3 0 |
| 708,000 | Stk. | Feb. 14 | 14 | Kent . . . . . | 280—290 | .. | 4 16 7 |
| 160,000 | ,, | ,, | 7 | Do. New, 7 p.c. max.. | 200—205 | .. | 3 8 4 |
| 1,043,800 | 100 | June 28 | 10½ | Lambeth, 10 p.c. max.. | 260—270 | .. | 3 17 9 |
| 406,200 | 100 | ,, | 8 | Do. 7½ p.c. max.. | 200—205 | .. | 3 18 1 |
| 350,000 | Stk. | Mar. 28 | 4 | Do. 4 p.c. Deb.. | 123—126 | .. | 3 3 6 |
| 500,000 | 100 | Feb. 14 | 13½ | New River, New Shares | 395—400 | .. | 3 8 9 |
| 1,000,000 | Stk. | Jan. 31 | 4 | Do. 4 p.c. Deb.. | 127—132 | .. | 3 0 7 |
| 902,300 | Stk. | June 14 | 6 | South-wark and Vauxhall { Ord. . . . | 172—177 | .. | 3 7 9 |
| 126,500 | 100 | ,, | 6 | 7½ p.c. max. | 162—167 | .. | 3 11 10 |
| 489,200 | Stk. | ,, | 5 | 5 p.c. Pref. . | 150—155 | .. | 3 4 6 |
| 1,019,585 | ,, | Apl. 12 | 4 | 4 p.c. A Deb. | 123—128 | −2 | 3 2 6 |
| 1,155,066 | Stk. | June 14 | 10 | West Middlesex. . . | 260—265 | .. | 3 15 6 |
| 200,000 | ,, | ,, | 4½ | Do. 4½ p.c. Deb. . | 138—143 | .. | 3 2 11 |
| 200,000 | ,, | Mar. 14 | 3 | Do. 3 p.c. Deb. . | 95—98 *Ex. div. | .. | 3 1 3 |

is taken into account, it must really be acknowledged that, not for their sakes alone, but for the good of the city at large, and, in the ultimate, for the good of the coal trade itself, it is in every way advisable that the transactions in the purchase of coal should be carried through with as much secrecy as possible. It was said in the discussion, to the effect that a mistake was made last year. This was as regards the period of the contract. If the Advisory Committee, who had full knowledge of the coal market, made a mistake as to the time for which they were to contract, this just shows, in a side way, that the belief of the coal-masters was genuine, that coal was to be dear; and that therefore it was preferable that the Corporation should contract for the whole year's supply. Coal did not remain dear for the whole year, and the Corporation have lost money thereby; but if, last summer, the coal tenders had been laid before the Town Council, I am sure that the minority of last week would all have been on the side of the whole year's contract, because of the higher price, and consequent higher wages to workmen. For it comes round to this, in the end—that the men who are endangering the reputation of the Corporation of Glasgow are mostly identical with those elected representatives who consider that they have a mandate for the promotion of better times for working people, and who, engrossed in this view, fail to observe the trend of the times in other directions, and are thus often either the blind leading or the blind following the blind.

The prosperity of Falkirk is well mirrored in its rapidly growing gas business. The Town Council, on Monday night, had before them the annual report by Mr. J. Kincaid, the Manager, which was to the effect that the quantity of gas manufactured was 123,357,500 cubic feet, being an increase over the previous year's make of 9,154,500 cubic feet, or at the rate of 8 per cent. The gas accounted for amounted to 106,847,000 cubic feet, showing an increase of 10,041,500 cubic feet, or at the rate of 10·37 per cent. The higher increase of gas sold is due to the unaccounted-for gas being reduced to 13·38 per cent., being 1·86 per cent. less than last year During the year 13,014 tons of coal were carbonized, yielding on an average 9478 cubic feet per ton, as compared with 9488 cubic feet the previous year. The coke and breeze sold amounted to 5338 tons; and the tar and ammoniacal liquor to 684,000 gallons. Increased efforts were made during the year to improve the condition of the mains and services; and the reduced leakage shows that the work has resulted in good. There was an increase in the number of consumers of 424. Of these, 322 were ordinary consumers, and 102 prepayment. The total number of consumers at May 15 was: Ordinary, 4673; prepayment, 1339. Speaking to the report, the Convener of the Works Committee (Mr. H. Russell) said that it was a very satisfactory one indeed; but he thought that when the Convener of the Finance Committee presented his report, it would be found to be even more generally pleasing; and he expected that they would be able to intimate a very considerable reduction in the price of gas. He had been looking over the reports for the last few years; and he found that in 1896 the total quantity of gas sold was 62 million cubic feet. In the past year they had actually sold about 110 million cubic feet, which showed clearly that they had doubled their output in seven years, or, to put it another way, the increase in the last six or seven years had been greater than it was during the previous sixty years. It was matter for gratification that the leakage was being reduced; and, altogether, he thought they had very great reason to be satisfied. There were similarly commendatory remarks by other members of the Council; and the report was adopted. It is much to be regretted that the Commissioners are being hampered in their erection of new works by the railway companies, who are very dilatory in arranging for the construction of sidings to the site. At this week's meeting, a deputation was appointed to see the railway managers upon the subject. The extraordinary quantity of gas which is now required to be made in the works shows the necessity there is for something being done immediately. The Commissioners are prepared to erect new works; but unless they are to get railway facilities to the place they have their eyes upon, they will have to relinquish the site in favour of another. How would it do for them to make the siding themselves, and get rid of terminal charges, or secure a rebate upon the cost of carriage? I see that the outlay on the Bill obtained authorizing the erection of new works is almost £600, which is certainly much cheaper than would have been a contested measure at Westminster.

During the year ending the 31st of May there was a decrease of £7167 11s. 9d. in the receipts for the residuals produced at the Glasgow Gas-Works, as they amounted to £200,266 1s. 6d., compared with £207,433 13s. 3d. for the year ending May 31, 1900. The amount of coal used was considerably increased, and consequently the quantity of secondary products was larger; and, so far as Scotland is concerned, the prices have fallen.

The Gas Committee of the Glasgow Corporation have had an application from the Milingavie Gas Company, offering to sell their undertaking, and they have asked that a deputation may be received by the Committee to consider as to the possible acquisition of the Company's works. The Committee have remitted the letter to a special Sub-Committee appointed some time ago, with power to receive and confer with the deputation in regard to the matter. Milingavie lies to the west or north-west of the city; and in the event of the Company's property being acquired by the Corporation, the nearest works to the city for the manufacture of gas will be those at Cambuslang, Renfrew, and Paisley.

The annual meeting of the Montrose Gas Company was held on Wednesday. The Directors reported a surplus of £1333 upon the year's working; and the dividend paid was at the rate of 50s. per share, the same as last year. They further reported that the works were in their usual good order, and that there had been an increase in the consumption of gas over the previous year of 122,000 cubic feet. The Chairman (Mr. Arthur Dickson) said there had been an increase in the cost of coal, to the amount of £600, over the average of previous years. Last year they raised the price of gas, but not so much as to meet the increase in the cost of coal. A letter was read from Mr. A. Melville Watt, who has for 51 years been Clerk and Treasurer to the Company, in which he said he felt it to be his duty, in the interests of the Company, to tender his resignation. The Chairman said they


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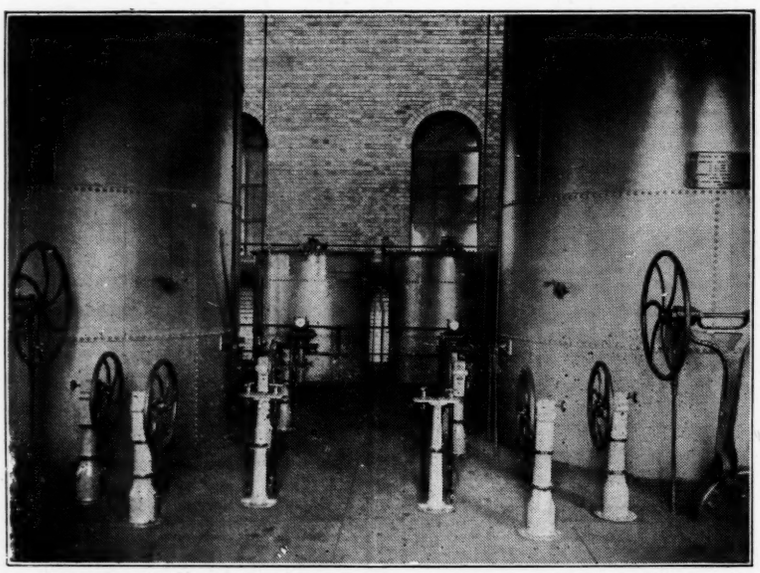

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all knew how faithfully and attentively Mr. Watt had discharged the duties of his office. They had had the matter of appointing a successor under consideration, and had come to the conclusion that, under their present able Manager (Mr. T. Douglas Hall), it might be sufficient to appoint a junior clerk. They also thought that Mr. Watt's long and valuable services should be recognized by their voting him £50 for the present year at least. They could only bind themselves for one year. This was agreed to, and it was resolved to advertise for a Clerk and Treasurer at a yearly salary of £70. Mr. Hall was then, according to the almost unique practice of the Company, unanimously re-elected Manager, and was thanked for his past services.

At the annual meeting of shareholders of the Nairn Gas Company, Limited, on Tuesday, the Chairman (Mr. Simpson) said he had pleasure in reporting the continued success of the Company. Notwithstanding the high price paid for coal last year, the report showed that the usual dividend (6 per cent.) would be paid, and that the price of gas would probably be reduced from 5s. 10d. to 5s. per 1000 cubic feet. He considered that while paying a medium dividend to the shareholders, the interests of the gas consumers must not be left out of consideration. The estimate of the Manager (Mr. G. Keillor) might admit of a still further reduction next year. The cost of coal last year was £262 more than in any previous year. The report was adopted.

The Carluke Gas Company last year sold 11,346,500 cubic feet of gas, an increase of 628,200 cubic feet. The profit for the year was £570. A dividend at the rate of 7 per cent. was paid, and £220 was carried forward. The price of gas was continued at 3s. 9d. per 1000 cubic feet. The Berwick and Tweedmouth Gas Company earned a profit last year of £1214, and paid a dividend of 10 per cent. The price of gas was fixed at 3s. 10d. per 1000 cubic feet. The Stow Gas Company have paid a dividend of 4 per cent. The Ferry Port-on-Craig Gas Company have reduced the price of gas from 5s. to 4s. 7d.

Some time since the Dumfries Water Commission resolved to ask Messrs. Mather and Platt, of Manchester, to remove a Reeves patent filter, on account of its not having given the duty which it was represented to give. It is but justice to Messrs. Mather and Platt to state that the Commission have now, upon fuller information, resolved to rescind their former resolution, and to retain the filter, which, it is now reported, removes about 75 per cent. of suspended matter from the water, and is much cheaper than sand filtration.

The very warm weather of the past week has led to such an extensive use of water that, in more places than one, there is beginning to be anxiety regarding the water supply. Arbroath seems suffering most; but it must be remembered that the water supply there is extremely limited—being only equal to about 13 gallons per head per day. The water is being shut off the lower lying levels at night, in order to let the higher levels have a supply once a day. The storage of water in the reservoirs of the Edinburgh Water Trust has decreased, during the past fortnight, by 203 million gallons. The delivery has been equal to 41 gallons per head per day. Since Jan 1 the rainfall has been 12·90 inches, as against 20·24 inches in the same period last year, and 19·72 inches in 1899.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 20.

**Sulphate of Ammonia.**—There has been more doing on the East Coast at an advance; while elsewhere the market has been steady. The closing quotations are £10 7s. 6d. per ton f.o.b. Hull, and £10 10s. to £10 11s. 3d. f.o.b. Leith and Liverpool. Buyers have been endeavouring to secure July and August delivery at prompt prices. But current production is being removed by a current demand; and makers are not concerned to sell ahead, unless at a substantial premium. For delivery July-September and October-March, the views of makers are unchanged; while buyers have not made up their minds to pay the premium required.

**Nitrate of Soda** is quiet; and, owing to arrivals, refined quality can be bought at 8s. 10½d. per cwt., *ex* quay. The quotation for ordinary quality is 8s. 9d. per cwt.

LONDON, *July* 20.

**Tar Products.**—There is not much business of note in tar products, with the exception of benzol, which is certainly firmer. Business has been done at 9¼d. f.o.b. London for July; while 9½d. is reported to have been paid for August shipment. Makers ask 10d. August-December; but at present consumers will not pay this price. Solvent remains in a very depressed condition; but one or two small orders have been placed for fine London makes over the next six months at fairly good prices, which, however, cannot be taken as a guide to the values ruling for shipment. There is nothing whatever doing in anthracene—one or two small parcels of "B" quality have lately been offered without finding buyers. Carbolic is still very dull, owing to the low prices at which crystals are now being offered. Business has been done in 60's at 2s. 2d. for July-December delivery. Pitch continues very firm. The demand from South Wales is certainly improving, especially for prompt delivery. Consumers appear to be rather short of stock. Beckton is still asking 32s. for next season; but this price has not yet been paid. For tar oils, the demand is scarcely so good. There is certainly more offering, especially in the North of England. Prices, however, remain about the same, although makers would have to reduce their quotations if they wished to arrange business to any extent. Just at present, it seems as though there was likely to be some severe competition for tar, judging by the inflated prices which have lately been paid in certain districts, which are altogether out of proportion to the ruling value, based upon the existing price of products.

The average values obtaining during the week are: Tar, 14s. 6d. to 17s. 6d. Pitch, east coast, 30s. to 31s.; west coast, 28s. to 28s. 6d., Benzols, 90's, 9d. to 9¾d.; 50's, 9½d. to 10d. Toluol, 10½d. to 11d. Crude naphtha, 4d. to 4¼d. Solvent naphtha, 1s. Heavy naphtha, 11d. to 1s. Creosote, 1¼d. to 1⅜d. Heavy oils, 2¼d. Carbolic acid, 60's, 2s, 2d. Naphthalene, 6os. to 7os.; salts, 32s. 6d. to 40s. Anthracene, "A," 2¼d. to 2⅜d.; "B," 2d. nominal.

**Sulphate of Ammonia.**—The market closes with a decidedly steadier


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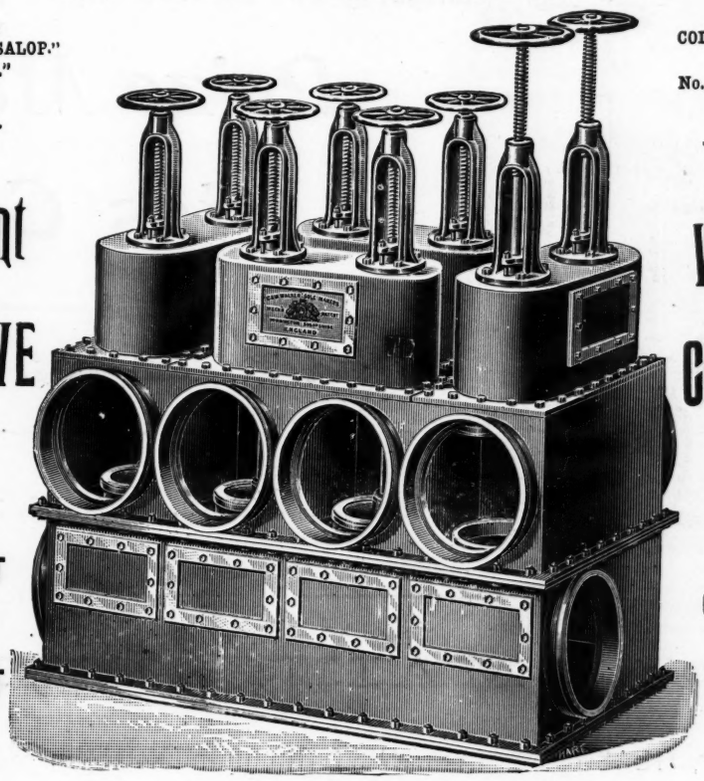

## Weck's Patent CENTRE-VALVE

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**THE ONLY ABSOLUTELY RELIABLE CENTRE-VALVE IN THE MARKET.**

tone. The Gaslight and Coke Company still maintain their quotation of £10 15s. per ton, and are reported to have declined business at £10 10s., or even £10 11s. 3d. One of the principal London Gas Companies have also refused £10 11s. 3d. for early shipment, but would doubtless accept £10 12s. 6d. In Leith, sales are reported at £10 10s. for prompt shipment; but this is certainly full value. Liverpool has been done at £10 10s., and in some instances £10 12s. 6d. has been paid for fine grey, early shipment. In Hull, the market is quiet. Sales are reported at £10 6s. 3d.; but makers ask £10 7s. 6d. for August shipment.

## COAL TRADE REPORTS.

**Lancashire Coal Trade.**—There is no further new feature to report in connection with the gas coal trade. Contracts are steadily being settled on much the same basis as reported last week—averaging 10s. per ton at the pit for unscreened gas coal, 10s. 6d. to 10s. 9d. for good medium screened gas coal, and 11s. to 11s. 3d. for best screened Wigan Arley gas coals. The keen competition of Derbyshire is, however, spoken of in connection with both gas coal and locomotive fuel; and the result of this has been seen in Yorkshire collieries having again had to come down to 9s. per ton for good hard coals, to secure further contracts with the railway companies. It is reported that Derbyshire collieries have taken as low as 8s. 3d. per ton at the pit for locomotive fuel. The position as regards other descriptions of fuel shows no material change, except that there is, if anything, a further quietening down in the demand; and notwithstanding the short time at the pits, stocks are accumulating in rather larger quantities. House coals are necessarily only in the most limited request; but prices are fairly steady, and now that the season is so far advanced, it seems questionable whether collieries will grant further concessions to any appreciable extent. In regard to common round coals for steam and forge purposes, the giving way on contracts with works has followed much the lines of that on locomotive fuel, and represents a reduction of about 4s. per ton compared with last year's prices. This brings the average to about 9s. per ton at the pit for ordinary steam and forge coal, though 9s. 6d. would represent more nearly the general quoted price on ordinary current sales. The shipping trade continues very inactive, with ordinary steam coal averaging 10s. to 10s. 6d. per ton delivered at the Mersey ports. The reduced output of slack tends to give a steadier tone to prices; and there is less cutting in quotations, and not so much competition with surplus from the outside. Prices, however, are not really stronger to any appreciable extent. Lancashire slack averages from 6s. 6d. and 7s. per ton at the pit for common, to 8s. for the better qualities; and slack is offering from other districts at prices varying a good deal according to quality, but, apart from carriage, on a considerably lower level than Lancashire rates. Coke is stronger, particularly in furnace sorts; good washed Lancashire furnace cokes being now quoted at 13s. to 13s. 6d. per ton at the ovens, with foundry cokes about 24s. to 25s. per ton.

**Northern Coal Trade.**—There is considerable briskness shown; but it is unequally felt in the different branches of the trade. Best Northumbrian steam coals are active, and there is a steady production, which is well taken up; the price being generally 13s. per ton f.o.b. Second-class steam are 12s. 3d. to 12s. 6d., and steam smalls 5s. to 5s. 3d. In the gas coal trade, there is rather unusual activity; and for occasional cargoes of best Durham kinds as high as 10s. 6d. to 11s. per ton f.o.b. is quoted, though this is considerably above the prices of the contracts that are now running. It is expected that the lower prices that have ruled for gas coals in the last few months—lower on the average than the preceding price—will soon give rise to a claim in the Durham coal trade for a further reduction of wages. Coke is steady, though the exports are rather limited. Best coke is 17s. to 18s. per ton f.o.b., blast-furnace coke 15s., and gas coke 12s. to 13s.

**Scotch Coal Trade.**—The market last week was almost non-existent, on account of the general suspension of work at the western collieries, and the fact that business men in Glasgow were on holiday. Quotations may be given at: Main 9s. to 9s. 6d. per ton f.o.b. Glasgow, ell 10s. to 10s. 6d., and splint 10s. to 10s. 6d. The shipments for the week amounted to 215,739 tons—a decrease of 20,668 tons upon the preceding week, but an increase of 18,261 tons upon the corresponding week of last year. For the year to date, the total shipments have been 5,078,221 tons—a decrease of 614,762 tons upon the same period of the previous year.

**The Carlisle Water Scheme.**—The Special Geltsdale Water Committee of the Carlisle Town Council held a meeting last Wednesday—the first since the Council meeting on the 9th inst., noticed in the "JOURNAL" last week. In the absence of Mr. Corbett, the Chairman, the Mayor (Alderman Hurst), presided. It was decided to take over the drawing and engineering staff; and a Sub-Committee was appointed to interview Mr. Boyd, the Resident Engineer, and make arrangements for having the staff and plans removed from the gas-works to some other suitable office. Instructions were also given to the Town Clerk to serve the notices to treat for the purchase of lands, way-leaves, &c., which have not already been dealt with; and Mr. Newton, the Gas and Water Engineer, furnished him with the necessary details to enable him to complete this work. The amended resolution passed by the Council in reference to the Geltsdale Water Scheme has been entered upon the minutes, the phrase "at least six months" having been substituted for the term of twelve months recommended by the Special Committee as the period for which the scheme should be postponed. The resolution now stands as follows: "That, in view of the present unsatisfactory position of affairs with regard to the Geltsdale water scheme, the small number of tenders, and the large discrepancy between them and the original estimate, and the unsatisfactory explanations of the Engineers, the Council be recommended to dispense with the services of the Engineer and Consulting Engineer, and after the remaining notices to treat are served, the whole matter remain in abeyance for at least six months, after which the very best available advice be sought."

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**Sales of Shares and Stock.**—At the Mart, Tokenhouse Yard, on Monday last week, Mr. Alfred Richards sold, by order of the Directors, shares and stock of the Romford Gas, Bournemouth Gas and Water, and Kingston-upon-Thames Gas Companies. The first lots offered were £5 "B" shares in the Romford Company (last dividend 9 per cent.), and they fetched from £8 10s. to £8 15s. per share. The next lots were £10 "B" shares (7 per cent.) in the Bournemouth Company, which fetched £15 15s. and £15 17s. 6d. apiece. The stock of the Kingston Company was 4 per cent., and it was sold at prices ranging from £101 to £102 per £100 of stock. A sale of £50,000 of 5 per cent. preference stock (1894) of the Newcastle and Gateshead Water Company took place recently at the Company's offices; Mr. Chas. A. Joel being the auctioneer. The £100 lots realized from £150 down to £142 each. An annuity of the amount of £8 8s., of the Arbroath Gas Corporation, was sold by auction on the 13th inst. at the upset price of £284.

**West Bromwich Traders and the Cost of the Electric Light.**—A deputation from the West Bromwich Tradesmen's Association recently waited upon the Electric Lighting Committee of the Corporation with the view of securing a reduction in the charges. Mr. Ault, on behalf of the deputation, argued that a number of tradesmen in the borough had been induced to have the electric light in their respective establishments in consequence of a statement by Alderman Pitt (Chairman of the Committee) that the cost of the current would not exceed that of gas at 2s. 4d. per 1000 cubic feet. But the charges were three, and in some cases four times more than those made for gas. It was further urged that unless there was a considerable reduction in future accounts it would be impossible for the tradesmen to continue using the light. The Committee, in reply, said that those tradesmen who complained of the excessive charges were using far more current than was necessary, and contended that the price of electricity at West Bromwich was much lower than it was at most places. The Committee signified their willingness to give the complaints of the tradesmen due consideration.

**Mansfield Gas and Water Supply.**—At the last monthly meeting of the Mansfield Town Council, the annual reports of the Gas and Water Committees were presented. The former showed that, after payment of interest on loans amounting to £1952 18s. 4d., and paying into the sinking fund £857 10s. 1d., the balance in hand on working capital account stood at £2391 13s. 5d., against £2422 8s. 2d. on March 31, 1900; being a loss of £30 14s. 9d. on the year's working. For this the great increase in the price of coal is responsible; the actual cost during the twelve months having been £9191 1s., against £5572 10s. 8d. in the previous year, an increase of no less than £3618 10s. 4d. The minutes were confirmed. The Water Committee, in their annual report, stated that though the receipts continued to show a substantial increase, the Committee had to express their regret that the year's working again resulted in an apparent loss amounting to £124 6s. 8d. It must be borne in mind, however, that this was after payment of dividends and sinking fund, and also the cost of the new mains and the Deacon meters. Had the latter been charged to capital, there would have been a profit of several hundred pounds transferred to the general district rate. The minutes were adopted.

**The Dangers of Electric Wires.**—At the meeting of the Committee of the Liverpool Workhouse last Thursday, the Vestry Clerk (Mr. Hagger) reported that the clerk of works had estimated the cost of installing the electric light in the dining-hall and church at the Workhouse at £229 2s. Mr. Foote moved that tenders be asked for on the specification of the clerk of works. Mr. Lowry seconded the motion. Mr. Richardson referred to the danger from fusion of electric wires, as recently exemplified in the Birkenhead Town Hall fire. The Chairman (Mr. W. Crosfield) mentioned that the Workhouse visitors had made a very strong report against the installation of the electric light at all. The Governor was also distinctly of opinion that gas was quite sufficient for the ordinary purposes of the dining-hall. Mr. Lowry, finding that the general opinion was unfavourable to the introduction of the electric light, suggested that the motion should be withdrawn; and this course was adopted.

**Warrington Corporation Gas and Water Finances.**—The abstract of the accounts of the Corporation of Warrington for the year ended March 31 last has just been issued by the Borough Treasurer (Mr. J. Fairhurst). From an aggregate balance statement, it appears that the liabilities of the Corporation up to that date amounted to £858,030, while the assets were valued at £1,183,850; leaving a balance to the credit of the county borough of £325,820. The gas-works account shows that there is a balance to the credit of the undertaking of £24,181, and that the gross profits for the year amounted to £8328, or nearly £2000 less than in the preceding year. From this has to be deducted £7860 for one year's interest, annuities, and sinking fund, and £2211 handed over in relief of rates—items which more than absorb the total profits. With reference to the Water Department, the profit for the year reached £13,012, from which has to be deducted £12,284 in respect of payments for interest, annuities, and sinking fund, the amount expended on new mains, and bank interest on an overdraft for the cost of extensions. Notwithstanding these deductions, there is a substantial balance to the good. Last year it was on the wrong side.

**Fatal Accident at the Reading Gas-Works.**—A serious accident, resulting in the death of one man and injury to two others, occurred at the Reading Gas-Works on Thursday, the 11th inst., at about seven o'clock. The Company are having a new tank and gasholder erected, and among the men engaged were James Wright, about 42, a labourer, and William Dunn, 32, and John Dunn, 24, brothers. Shortly before the accident, the men had been instructed to remove some scaffold brackets. After one of them had been taken out, the remaining men, including Grant, a labourer, proceeded to remove another. Grant could not see the other men, but heard them rapping to guide him in his efforts to remove the brackets. He, however, dislodged the wrong bolt, and the boarding which it supported giving way, Wright and the Dunns were thrown down into the tank, a distance of 15 feet. As soon as possible they were conveyed to the hospital, where Wright expired half-an-hour after admission. William Dunn sustained serious internal injury, and his brother had a fractured thigh. At the inquest the next day, the Jury returned a verdict of "Death from injuries caused by an accidental fall from a scaffold."

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**Seville Water-Works Company, Limited.**—The annual meeting of this Company was held last Friday at the Cannon Street Hotel; Mr. Cowley Lambert presiding. The Secretary (Mr. J. M. Hamilton) having read the notice convening the meeting, the Directors' report was taken as read. It stated that the income for the year amounted to £30,810; and, after reducing working expenses, the cost of laying on services, and debenture interest, the net profit for the year was £5299. Adding the unappropriated profit at March 31, 1900 (£9256), and charging the contribution to the sinking fund of £813, the amount standing to the credit of the profit and loss account was £13,742, out of which the Directors recommended a dividend of 2 per cent. The Chairman, in moving the adoption of the report, referred with sorrow to the death of the late Chairman, Mr. David Evans, who had been a Director of the Company from its commencement, and the head of the Board for ten years. Referring with regret to the fact that great success had not so far attended the Company, the Chairman said this had been entirely caused by the position of affairs in Spain, both national and municipal. But now that there had been a settlement with the town upon all outstanding questions, he ventured to hope that the lines of the Company would lay in more pleasant places in the future. The business was in a good state; the revenue having increased by about 31,000 pesetas. But the expenditure had also largely increased, owing to the long-continued drought in Spain. After paying the dividend recommended, there would be a balance of £8320 to be carried forward. The Directors considered it only right, in the present position of affairs in Seville, with the possibility of the drought continuing, and with the knowledge that fresh works for a gravitation supply of water must be constructed in the immediate future, that they should carry forward a considerable balance. To execute the new works, fresh capital was required to the extent of something like £20,000. The Board therefore thought this would be a convenient opportunity for putting the finances of the Company on a sounder basis; and so a resolution would be proposed asking the shareholders to acquiesce in a scheme by which the present debenture debt should be paid off, and a fresh issue of bonds, amounting to £180,000, should be created, bearing interest at 5 per cent., and repayable in 50 years by annual drawings at £105. The motion, including the declaration of the 2 per cent. dividend, was carried. Then a set of resolutions was proposed by the Chairman, and seconded by Mr. F. S. Jackson, dealing with the existing debenture debt and the creation of the new debenture bonds. Count de Torre Diaz proposed an amendment, in which he set forth an alternative scheme. But it was not seconded; and the Directors' proposals were unanimously adopted. The retiring Directors and the Auditors were re-elected; and thanked the Chairman and Directors for their services.

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Mr. Will Thorne, General Secretary of the Gas Workers' Union, has received permission to stand as the parliamentary candidate for South-West Ham.

Messrs. R. Dempster and Sons, of Elland, have secured the order from the Skelmersdale Urban District Council for a steel tank and telescopic gas-holder.

The Brandon Bridge-Building Company have secured an order from the Glasgow Corporation for the construction of a series of gas purifiers and lime-sheds, at the new Provan Gas-Works of the Corporation. The price is about £40,000.

In the paragraph last week (p. 172) on the subject of the increased storage at the Rushden and Higham Ferrers Gas-Works, the increase in the salary of the Engineer and Manager (Mr. Thomas Watson) should have been given as £50 per annum.

At the meeting of the Board of Directors of Messrs. C. & W. Walker, Limited, held last Thursday at the Grand Hotel, Birmingham, it was resolved to pay an interim dividend for the six months ending the 31st inst., at the rate of 5½ per cent. per annum, less income-tax, on the cumulative preference shares, and on the ordinary shares at the rate of 10 per cent. per annum, free of income-tax.

Mr. A. A. G. Malet, Assoc.M.Inst.C.E., held an inquiry on behalf of the Local Government Board last Thursday in regard to an application by the Ilkeston Corporation for sanction to the borrowing of £7496 for gas-works purposes. The money is required partly for replacing worn-out plant and extending the works, and partly for the erection of buildings already sanctioned by the Board.

The London and Stratford employees of the Richmond Gas Stove and Meter Company, Limited, held their fourth annual excursion to Yarmouth on Saturday week. Between 400 and 500 employees and friends left Liverpool Street in the "Richmond Special Train," at six a.m., reaching Yarmouth at 9.30. Breakfast was served on arrival, and then the party distributed themselves to enjoy the breezes for which Yarmouth is justly celebrated. At 12.45 dinner was served in the Aquarium, after which short speeches were made by the Chairman (Mr. E. W. T. Richmond), Mr. H. M. Thornton (London General Manager), Mr. J. W. Slack (Senior Traveller), and Mr. W. M'Intyre (Works Manager). A presentation was also made by the Chairman to the Works Fire Brigade in recognition of their smartness in extinguishing the fire that recently broke out on the premises adjoining the Company's Stratford Works.

An enjoyable cricket match was played on the Leicestershire Old County Ground on Saturday between teams representing the Warrington and Stratford Works of the Richmond Gas Stove and Meter Company, Limited. Great interest was taken in the match by the workmen of both factories; and a large number of them accompanied their respective teams in the special saloons provided by the Midland Railway Company at St. Pancras and Warrington. Stratford, as the challengers, took the field first, and at lunch time had scored 100 for 4 wickets; the innings afterwards closing for 153. Stratford had 90 minutes' batting, and when stumps were drawn had lost 8 wickets for 98 runs. The game thus ended in a "draw" in favour of the Northern team. Luncheon was provided for the teams in the Cricket Ground Hotel; and after the match, the teams dined together at the Wyvern Hotel. The match was voted a great success, and is, we learn, likely to become an annual institution.


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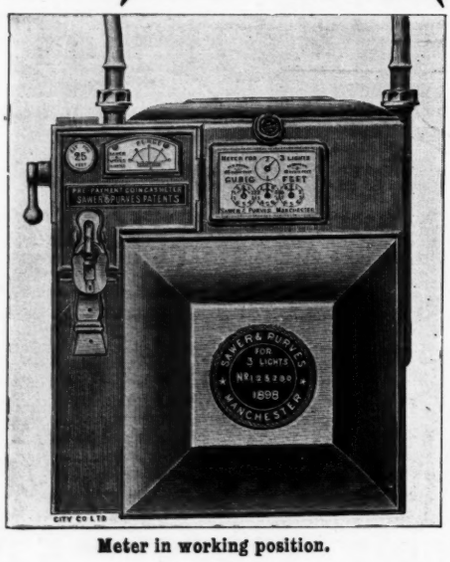
(BRANCH OF METERS LIMITED),

Telegraphic Address: "SAWER, MANCHESTER."
National Telephone: 3289 MANCHESTER.

NELSON METER WORKS, MILES PLATTING,
**MANCHESTER.**

**Makers of Meters fitted with**

# PATENTED Detachable Prepayment Attachment.




**Meter in working position.**

**Meter with attachment removed without uncoupling.**

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WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.


**GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.**

**OXIDE OF IRON.**

**O'NEILL'S Oxide has a larger annual** sale than all other Oxides combined. Purity and uniformity of quality guaranteed.
JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON BUILDINGS,
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**"VOLCANIC" FIRE CEMENT.**
Resists 4500° Fahr. Best for use in GAS-WORKS.
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For all Joints in connection with Oil Gas Plant and Sulphate Plant.
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Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

**HYDRATED OXIDE OF IRON.**
**PREPARED from Pure Iron.**
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
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**SADLER & CO., Ltd., Middlesbrough,** Tar Distillers and Tar Colour Manufacturers. BENZOL specially prepared for Gas Enrichment free from Sulphur. Pure Hydrated OXIDE OF IRON for Purifying Gas either for Sale or Lent on Hire. Always Buyers of GAS TAR and AMMONIACAL LIQUOR.

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**H. GREENE & SONS, Ltd., are pre**pared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.
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Telegrams: "LUMINOSITY."

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**HIGH-CLASS CYCLES at Reasonable** and LOW PRICES. Guaranteed and sent on approval. For Cash or Gradual Payments. Catalogue post free. Old Machines Exchanged or Repaired.
MELROSE CYCLE COMPANY, COVENTRY.

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BROTHERTON AND CO., Tar Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

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SATURATORS and LEAD WORK for Sulphate of Ammonia Plants.
For REPAIRS or ALTERATIONS, ring up "0848 BOLTON," or Telegraph "SATURATORS, BOLTON."
Largest Practice and most Up-to-Date Works in Britain.
JOSEPH TAYLOR AND CO., Central Plumbing Works, Victoria Square, BOLTON.

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First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Addresses:
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Messrs. J. C. CHAPMAN & CO., Chartered Patent Agents, ADVISE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
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**AMMONIACAL LIQUOR wanted.**
BROTHERTON AND CO., Ammonia Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

**PREPAYMENT GAS-METERS.**
**H. WATERFALL, General Gas-Fitter,** No. 9, Church Lane, Aston, Birmingham, is prepared to give QUOTATIONS to Gas Companies or Corporations for Pipe work (either in Iron or Compo.), Fittings, and Stoves complete, or Labour only.

**ADVERTISER (24 Years of age),** vacating Situation as SECRETARY to a Gas Company, seeks similar post. Could assist in Management of Works if required. Thorough Experience. Excellent Testimonials. Satisfactory reasons for changing.
Address No. 3714, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, for a small Gas-Works, a** steady young Man as STOKER, and to make himself generally useful. Used to Engine and Exhauster.
Apply to the MANAGER, Gas Company, Knighton, RADNORSHIRE.

**METER AND PHOTOMETER TESTER.**
**WANTED, immediately, an experienced** young Man who thoroughly understands Meter Testing and the use of the Photometer.
State Wages required, Age, and Particulars, to No. 3720, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, by a large Gas Undertaking** in the South-East of England, two competent FITTERS. They must be well up in the Fitting of the Prepayment System to Houses, fixing Meters, Stoves, &c. Wages, 7d. per hour. Only capable men need apply.
Reply, stating Experience and sending References, to No. 3721, **care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.**

**ASSISTANT-Manager required for** Works near London, making 50 Millions per annum.
Applicants must have a thorough practical knowledge of Gas-Works routine, including Sulphate Plant, &c.
State Salary required, Age, and Qualifications.
Apply, by letter, to No. 3722, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**MARKET HARBOROUGH URBAN DISTRICT COUNCIL.**
**(GAS DEPARTMENT.)**
**WANTED, a thoroughly competent** Man as FITTER, METER INSPECTOR, &c. Must have a good knowledge of Incandescent Lighting.
Apply, stating Experience, Age, and Wages required, with References, to
A. T. HARRIS,
Engineer and Manager.
Gas Offices,
Market Harborough, July 11, 1901.

**CORPORATION OF BIRMINGHAM.**
**(GAS DEPARTMENT.)**
WINDSOR STREET WORKS.
**WANTED, for the above Works, a** thoroughly efficient GENERAL FOREMAN. Must be a trained Mechanic, and accustomed to the management of men. Good Wages to a competent Man.
Application to be made on or before the 1st of August in own handwriting, stating Age, Salary required, and giving Particulars of Experience, with *copies* of any recent Testimonials, to the ENGINEER, Gas-Works, Windsor Street, BIRMINGHAM.

**OXIDE OF IRON OF FINEST QUALITY.**
**BALE'S Special Fire Cement should be** used to keep Retorts, Furnaces, &c., in good repair during the heavy Winter Work.
Send for full Particulars to
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**SHEFFIELD CORPORATION WATER-WORKS.**
PLUMBING FITTINGS INSPECTOR.
**WANTED, a trained and properly** qualified PLUMBER to fill the post of PLUMBING FITTINGS INSPECTOR. Must have held a similar position. Wages 35s. to 40s. per week.
Apply, stating Age and Experience, with Refererces, to the undersigned, not later than the 27th of July, 1901.
WM. TERREY,
General Manager.
Water-Works Office: Town Hall,
Sheffield, July 12, 1901.

**SCARBOROUGH GAS COMPANY.**
**WANTED, by the Directors of this** Company, an experienced and competent MANAGER and SECRETARY to take entire charge of their Works (make about 280 million cubic feet). He must have a practical knowledge of the Manufacture of Coal and Water Gas and Sulphate of Ammonia upon the best modern Systems. The person appointed to devote the whole of his time to the duties, and be able to design and carry out Alterations and Extensions of Plant.
Fixed Salary £500 per annum.
Canvassing Directors strictly prohibited.
Applications to be by letter, marked "Manager," stating Age, Training, and Experience, accompanied by *copies* of three Testimonials of recent date, addressed to the CHAIRMAN, at the Company's Office, 32, Westborough, SCARBOROUGH, on or before Ten a.m. on Tuesday, the 30th of July, 1901.

**BOROUGH OF ABERAVON.**
**(GAS DEPARTMENT.)**
**THE Gas Committee are prepared to re**ceive APPLICATIONS for the position of ENGINEER and MANAGER of their Gas-Works.
Annual make, about 24 million cubic feet.
Candidates must possess a thorough knowledge of the Manufacture and Distribution of Gas.
The person appointed must devote the whole of his time to the duties, which will include the keeping of all books appertaining to the management.
Age not to be under 25 years, or over 45 years.
Salary at the rate of £2 10s. per week, with House, Coal, Gas, and Rates and Taxes free.
Applications, in Candidates' own writing, accompanied by *copies* of three recent Testimonials, to be forwarded to me, marked "Manager," not later than the first post on Tuesday, Aug. 6 next.
Canvassing will be a disqualification.
By order,
M. TENNANT,
Town Clerk.
Aberavon, July 19, 1901.

**TO BE SOLD—**
GASHOLDER, 30 ft. by 12 ft. Cable Guided. New in 1895.
CENTRE-VALVE, 15 in. diameter, by Walker, for Four Purifiers.
Write J. WRIGHT, Bridge House, BLACKFRIARS, E.C.

**FOR SALE, Cheap—Two Purifiers, 8 ft.** square by 4 ft. deep, in good condition, with Valves, Connections, and Lifting Gear.
INQUIRIES for all kinds of SECOND-HAND GAS PLANT will also be esteemed by SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

**GAS PLANT for Sale—I can always offer** NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY Gas Engineer, Thornhill, DEWSBURY.

**FOR SALE—Cheap to Clear.**
One GASHOLDER, 50 ft. by 16 ft., 12 Years old.
One ,, 25 ft. by 10 ft., 6 ,,
One ,, 15 ft. by 10 ft., 6 ,,
Erected complete. New Steel Tanks supplied.
Six Annular CONDENSERS, 30 feet high. Perfect.
Two PURIFIERS, 22 ft. by 8 ft., complete and good.
Four ,, each 10 ft. and 6 ft. square.
Two ,, each 8 ft. and 6 ft. square.
Other Plant and Sizes in Stock. Photometers, Gauges, &c.
Apply J. FIRTH BLAKELEY & Co., Thornhill, DEWSBURY.

The List of Applications will Open This Day (Tuesday), the 23rd July, 1901, and Close on or before Thursday, 25th July, 1901, for London and the Country.

# THE POWER-GAS CORPORATION, LIMITED.

Incorporated under the Companies Acts, 1862 to 1900.

Capital .. .. .. .. £350,000, divided into

250,000 Ordinary Shares of £1 each, entitled to a Preferential dividend of 6 per cent. per annum, with further participation in the profits as mentioned below .. £250,000

100,000 Deferred Shares of £1 each .. .. 100,000

The Ordinary shares are first entitled to a Preferential dividend at the rate of 6 per cent. per annum, payable out of the profits, which, in respect of each year, the Company shall determine to distribute, and to one-half of the residue of such profits after payment thereout of a dividend of 6 per cent. on the Deferred shares. The Deferred shares are entitled to a dividend at the rate of 6 per cent. per annum, payable out of the profits, which, in respect of each year, the Company shall determine to distribute, after payment thereout of a dividend of 6 per cent. on the Ordinary shares, and are also entitled to one-half of the residue of such profits. In a winding-up the Ordinary shares rank as to capital in priority to the Deferred shares, and after the Deferred shares have been repaid their capital the surplus assets will be divided, one-half among the Ordinary shares, and the other half among the Deferred shares, in proportion to the amounts respectively paid up or credited thereon.

The purchase consideration payable to the Vendors will consist of 66,462 Ordinary shares and the whole of the Deferred shares, all of which will be credited as fully paid. No part of the purchase consideration is payable in cash.

There are NOW OFFERED for SUBSCRIPTION 183,538 of the ORDINARY SHARES, payable:

On application .. .. £0 2 6 per share.
On allotment.. .. .. 0 2 6 ,,

And the balance, as and when required by calls not exceeding 5s. at intervals of not less than two months.

60,000 of these Ordinary shares have already been applied for, and will be allotted on the terms of this prospectus.

DIRECTORS.

The Right Hon. Sir HENRY H. FOWLER, G.C.S.I., M.P., Wolverhampton, Chairman.

Dr. Ludwig Mond, F.R.S., 20, Avenue Road, London, N.W. (Joint Managing Director Brunner, Mond, and Co., Limited), Vice-Chairman.

John Brock, J.P., 30, James Street, Liverpool (Chairman of the United Alkali Co., Ltd.), Vice-Chairman.

Robert Armitage, Farnley Lodge, Farnley, near Leeds (Joint Managing Director Farnley Iron Co., Ltd.).

George T. Beilby, St. Kitts, Slateford, Edinburgh (Director Castner Kellner Alkali Company, Limited).

R. Seymour Benson, A.R.S.M., Middleton St. George, County Durham (Director Ashmore, Benson, Pease, and Co., Limited).

R. Russell Crewdson, Elmcroft, Darlington (Director Ashmore, Benson, Pease, and Co., Limited).

Edward J. Duff, Assoc.M.Inst.C.E., M.I.M.E., Holly Lodge, Cressington Park, near Liverpool (Chief Engineer United Alkali Company, Limited).

Alfred Mond, 66, Lowndes Square, London, S.W. (Director Brunner, Mond, and Co., Limited).

E. Lloyd Pease, Hurworth Moor, Darlington (Director Pease and Partners, Limited).

Emile Schweich, F.C.S., 20, Hyde Park Square, London, W. (Chemical Engineer).

Bankers—Parr's Bank (Limited), Bartholomew House, London, and branches; Barclay and Company (Limited), Lombard Street, London, and branches.

Brokers—Lumsden and Myers, 29, Cornhill, London, and Stock Exchange.
Liverpool—Ashton, Tod, & Noble, 7, Tithebarn St.
Newcastle-on-Tyne—Paton Brothers, 3, Royal Arcade.
Manchester—Hy. Cooke and Sons, 30, King Street.
Sheffield—Barber Brothers & Wortley, George St.
Glasgow—Aitken McKenzie and Clapperton, 2, West Regent Street.

Solicitors—Ashurst, Morris, Crisp, and Co., 17, Throgmorton Avenue, London.

Auditors—W. B. Peat and Co., 3, Lothbury, London, and Middlesbrough.

Secretary (pro. tem.)—Ernest Crewdson.
Registered Offices—17, Coleman Street, London.

## PROSPECTUS.

This Company has been formed for the purpose of developing in the United Kingdom the patented processes and inventions, more fully described hereafter, for the production of cheap power and heating gas (commonly known as "Mond Gas"), with the simultaneous recovery of sulphate of ammonia, and to carry on the manufacture and sale of the plant and apparatus and all accessories necessary to the working of these processes.

For this purpose the Company will acquire (1) from Dr. Ludwig Mond, F.R.S., the United Alkali Company (Limited), and Mr. E. J. Duff respectively, eighteen patents, and applications for patents, a schedule of which accompanies the prospectus, protecting these inventions, together with all future developments and improvements made or controlled by the patentees, and (2) the entire issued share capital of Messrs. Ashmore, Benson, Pease, and Co. (Limited), constructional engineers, of Stockton-on-Tees.

The processes for which the Company acquires the patent rights completely convert cheap qualities of coal commonly known as slack or dross into combustible gas, sulphate of ammonia, and ashes, at one operation, by means of special gas generators and ammonia-recovery plant, and produce from each ton of slack about 15 times the volume of gas, and from three to four times the weight of sulphate of ammonia obtainable in the manufacture of illuminating gas.

The processes have been worked out after extensive and costly experiments at the Winnington Works of Messrs. Brunner, Mond, and Co. (Limited), and at the Fleetwood Works of the United Alkali Company (Limited), where large installations have been successfully at work for some time, which have already gasified and recovered the ammonia from over 600,000 tons of slack, the gas being used for various kinds of heating operations, and the production of power in gas-engines.

Similar large installations, with ammonia recovery plant, to produce gas for power and heating purposes, are at present being erected and near completion at the works of Messrs. Sir W. G. Armstrong, Whitworth, and Co. (Limited), Manchester; the Farnley Iron Company (Limited), Leeds; and Messrs. Albright and Wilson (Limited), Oldbury. Several smaller installations (without ammonia recovery), for supplying gas-engines from 250-horse power upwards, have been in use in different places for some time. In addition, licenses have been granted for installations of varying capacity to the Trafford Power and Light Supply (Limited), Trafford Park, Manchester; the United Turkey Red Company (Limited), Alexandria, N.B.; the Railway and General Engineering Company (Limited), Nottingham; Messrs. Monks, Hall, and Company (Limited), Rolling Mills, Warrington; Messrs. Cadbury Brothers (Limited), near Birmingham; and others. The total capacity of all these installations will be equal to about 250,000 tons of slack per annum. Of these licenses, the two last-named, granted since the 15th January last, will be transferred to the Company, who will receive the royalties payable thereunder; but all licenses granted previously remain the property of the patentees. Negotiations for other installations are in progress on behalf of the Company.

The recent discussion of the Mond Gas Bill (which has successfully passed the committee stage of both Houses of Parliament), for establishing central stations to supply South Staffordshire with cheap heating and power gas, has brought out very fully the great advantages this gas offers for the production of power, and for heating purposes. Evidence was given by expert witnesses, including very eminent authorities in this country, showing that this method of power production and heating is very economical (although the gas is inferior in heating power to illuminating gas in the ratio of four to one), and that it effects a great saving in its application for heating purposes in a large number of industries, including the manufactures of iron, steel, glass, pottery, chemical products, &c., &c.; and that in its application for the production of power and of electricity through the medium of large gas engines, the saving in the amount of fuel required per horse power, as compared with the best steam engines in use in this country, equals fully 50 per cent., and as compared with ordinary steam engines, as much as 75 per cent., and, at the same time, many additional advantages are gained, by avoiding the transport of coal and ashes through the works, and by the great facility of stopping operations at a moment's notice.

The economy of these processes is enhanced by the large quantity of sulphate of ammonia (one of the most potent fertilizers known) obtained, in addition to the gas, representing for every ton of fuel used a value of not less than eight shillings at present prices. The cost of the gas in the vicinity of our coalfields is thus reduced to a point which makes it possible for this country to produce electricity on a large scale at a price comparing favourably with that charged to-day by the Niagara Falls Power Company. This has been proved at the works of Messrs. Brunner, Mond, and Company (Limited), of Northwich, where an electrical installation of about 1000-h.p. is, and has been, running almost continuously day and night for several months, the electricity being generated by means of large gas-engines, working with this gas, whilst a smaller installation has been working for several years. A similar application of the gas for driving gas-engines and generating electricity has for some time been in successful operation at the works of the United Alkali Company (Limited), and at the Northwich Electric Supply Station. The application of the inventions acquired by the company will enable this country to maintain its position in a number of industries which have been most seriously threatened by the cheap water power abroad.

An important feature of these inventions is that heat and power are produced from ordinary fuel without smoke.

It is anticipated that these advantages will lead to the adoption of the inventions by a large number of manufacturers and other producers of power, such as electric installations, and also to the establishment of central stations throughout the United Kingdom for the supply and distribution of the gas. It will be one of the objects of the Company to organize such undertakings, and this will be facilitated by the passing of the Mond Gas Act above referred to.

The recent patent of Mr. Duff for obtaining heating and power gas and sulphate of ammonia from town refuse, which is included in the patents acquired by the Company, is expected to be largely adopted by corporations and local authorities. This process is also dustless and smokeless.

The consumption of fuel in this country now amounts to upwards of 150,000,000 tons annually, of which about 30,000,000 are estimated to be used in the production of power by means of steam engines, and nearly the whole of the balance for heating purposes. There is every probability that a large number of these steam engines and steam boilers will in time be replaced by gas-engines and gas producers, and that a considerable proportion of the coal now used in the raw state for heating will in the future be converted into gas, thus giving the operations of the Company a very wide scope.

In order to utilize its patent rights and inventions to the best advantage, and to establish a permanent business for the manufacture and sale of its plant, the Company has entered into an agreement to acquire, as a going concern, as on 31st March, 1901, the business and connection of Ashmore, Benson, Pease, and Co. (Limited), manufacturers of gas plant and general engineers, Stock-on-Tees. This is carried out by acquiring all the issued shares of the Company, consisting of 1900 fully-paid Preference shares of £10 each, 318 fully-paid Ordinary shares of £10 each, and 4000 Ordinary shares, having £7 10s. per share paid up thereon, the total amount of capital represented by such Preference and Ordinary shares being £62,180. The property and assets of Ashmore, Benson, Pease, and Co. (Limited), as appearing in their audited balance-sheet to 31st March, 1901, amounted to £82,218 19s. 3d., as against liabilities of £29,428 5s. 7d. The consideration payable by this Company for the acquisition of the said shares is 52,177 fully-paid £1 Ordinary shares of this Company. The works have been established for upwards of 30 years. The freehold land occupied by the works extends to over eight acres; it is connected by sidings with the North-Eastern Railway system, and has easy access to the River Tees. The works are in the midst of the iron and steel works of the Cleveland district, and within a short distance of the important coalfields of Durham, and are, therefore, well situated for the economical production of the plant proposed to be manufactured by the Company. In order to enable the works to cope with the large amount of additional work which the building of the plant for the Company's processes will entail, the Directors intend to substantially enlarge them, and to equip them thoroughly by the addition of special tools and appliances for the manufacture of the Company's specialities.

The Company will have the very valuable assistance and advice of Dr. Mond and Mr. Duff, whilst Mr. Emile Schweich, who for many years assisted in the development and superintended the working of Dr. Mond's gas plant at the Winnington Works of Messrs. Brunner, Mond, & Co., Ltd., and who has subsequently for several years conducted the business connected with the introduction into general use of Dr. Mond's gas patents, has agreed to act as Managing Director of the Company.

Mr. R. Seymour Benson, who has been Managing Director of Ashmore, Benson, Pease, and Co., Limited, for a number of years, will continue to act in that capacity, under the agreement hereinafter mentioned.

The proceeds of the whole of the shares offered for public subscription will, after payment of the preliminary expenses, be used as working capital in the development and prosecution of the Company's business.

The Directors fully believe that the Company will realize substantial profits from its various operations, and this confidence is entirely shared by the Vendors, who are receiving the whole of their consideration in shares.

The consideration to be paid to the Vendors for the various properties will be satisfied by the allotment of 66,462 fully-paid Ordinary shares and 100,000 fully-paid Deferred shares. No part of the purchase-money will be payable in cash.

Of the said purchase consideration to be paid to the Vendors for the various properties as above mentioned 57,145 Deferred shares are to be allotted to Dr. Ludwig Mond or his nominees, 7143 Ordinary and 21,429 Deferred shares to Mr. Edward James Duff, 7142 Ordinary and 21,427 Deferred shares to the United Alkali Company, Limited, and 52,177 Ordinary shares to the shareholders of Ashmore, Benson, Pease, and Co., Limited.

Brunner, Mond, and Co. (Limited) and Mr. Emile Schweich are, by arrangement with Dr. Ludwig Mond, entitled respectively to 11,429 and 9,143 of the said 57,145 Deferred shares, and Mr. Alfred Mond is interested therein as being a director of and the holder of 550 Preference shares of £10 each and 3,420 Ordinary shares of £1 each in Brunner, Mond, and Co. (Limited). Mr. John Brock is interested in the said 7142 Ordinary shares and 21,427 Deferred shares as being a director and the holder of 900 shares of £10 each in the United Alkali Company (Limited).

The following contracts have been entered into, viz.:

(1) Agreement dated 16th July, 1901, between Dr. Ludwig Mond, of 20, Avenue Road, London, N.W., one of the vendors of the property proposed to be acquired by the Company, as above mentioned, of the one part, and the Company of the other part.

(2) Agreement dated 16th July, 1901, between Edward James Duff, of Holly Lodge, Cressington Park, near the city of Liverpool, and the United Alkali Company (Limited), whose registered office is at 30, James Street, in Liverpool aforesaid, two other of the vendors of such property, of the one part, and the Company of the other part.

(3) Agreement dated 16th July, 1901, between the undermentioned shareholders of Ashmore, Benson, Pease, and Co. (Limited), of Stockton-on-Tees, being the vendors of the above-mentioned 52,180 shares of that Company, to be acquired by this Company, as above mentioned, of the one part, and the Company of the other part, viz.: [See table, p. 237.]

(4) Agreement dated 16th July, 1901, between Robert Seymour Benson of the one part, and Ashmore, Benson, Pease, and Co. (Limited), of the other part, for the appointment of Mr. Benson as Managing Director of that Company.

A report upon the Mond gas has been made by Mr. Richard Threlfall, F.R.S. A copy of his summary of this report accompanies the prospectus, and the full report can be seen at the offices of the Company's solicitors.

The qualification of each Director has been fixed by the Articles of Association at 500 shares, and the following are the provisions of the articles as to the remuneration of the Directors, viz.:

85. In each year the Directors shall be entitled to receive as remuneration a sum at the rate of £3500 per annum, and, in addition, 5 per cent. of the net profits of the Company, which remuneration shall be divided among them in such proportion and manner as they shall from time to time agree, or, in default of agreement, equally. The Company in general meeting may increase the amount of such remuneration, either permanently, or for a year or longer term.

87. (b) The Board may appoint from time to time any one or more of their number to be Managing Director or Managing Directors, on such terms as to remuneration, and with such powers and authorities, and for such period as they deem fit, and may revoke such appointment.

87. (h) The Board may grant to any Director required to go abroad, or to render any other extraordinary service, such special remuneration for the service rendered as they think proper.

The articles also provide that, while Brunner, Mond, and Co. (Limited), Dr. L. Mond, the United Alkali Company (Limited), and Mr. Edward James Duff respectively shall remain the registered holders of not less than 2000 Deferred shares of the Company, they shall each have power to appoint one Director of this Company, and from time to time to remove him from office and appoint another person in his place.

The minimum subscription on which the directors will proceed to allotment is 75,000 Ordinary shares, exclusive of the 66,462 Ordinary shares allotted as fully paid to the vendors.

The amount of the preliminary expenses is estimated at £6000. The brokerage agreed to be paid in respect of the subscription of Ordinary shares is 3d. per share.

The Articles of Association, and copies of the above contracts and report, can be seen at the offices of the company's solicitors on any day while the list remains open, between the hours of Eleven and Five.

Application for a Stock Exchange settlement and quotation will be made in due course.

Applications must be made on the accompanying form, and forwarded with the amount payable on application to the bankers of the company.

Prospectuses may be obtained from the bankers, brokers, solicitors, and auditors of the company, and at the registered offices.

This prospectus has been filed with the Registrar of Joint Stock Companies.

London, 18th July, 1901.

| Names, Addresses, and Descriptions of the respective Vendors. | Number of Shares sold by them. £10 Pref. Shares, all fully paid. | £10 Ord. Shares. | Amount per Share paid up on the Ordinary Shares. £ s. d. | Amount paid upon the whole of the Shares of the respective Vendors. £ s. d. | Number of fully paid Ordinary Shares of this Company forming the consideration for the Sale. |
|---|---|---|---|---|---|
| Robert Seymour Benson, Middleton St. George, Darlington, Engineer | | 1417 | 7 10 0 | 11,747 10 0 | 11,747 |
| Edward Lloyd Pease, Hurworth Moor, Darlington, Coal Owner | | 112 | 10 0 0 | | |
| William Whitwell, Saltburn-by-the-Sea, Ironmaster | 300 | 1388 | 7 10 0 | 13,575 0 0 | 13,575 |
| James Wright, Lanercost Road, Tulse Hill Park, Engineer | | 54 | 10 0 0 | | |
| Walter Pease, Brinkburn, Darlington, Esquire | | 974 | 7 10 0 | 8055 0 0 | 8055 |
| Thomas Parkinson, Stockton-on-Tees, Cashier | | 75 | 10 0 0 | | |
| William Frederick Smithers, Middlesbrough, Draughtsman | | 71 | 7 10 0 | 712 10 0 | 712 |
| Reginald Pease, Hurworth, Darlington, Iron Manufacturer | | 18 | 10 0 0 | | |
| Theodore Crewdson, Norcliffe, Cheshire, Esquire | 500 | 50 | 10 0 0 | 5202 10 0 | 5202 |
| Alfred Crewdson, Alderley Edge, Cheshire, Esquire | | 27 | 7 10 0 | | |
| Robert Russell Crewdson, Darlington, Engineer | 100 | — | — | 1000 0 0 | 1000 |
| George Edward Wilson, Kidderminster, Chemists' Manufacturer | 900 | 27 | 7 10 0 | 9202 10 0 | 9202 |
| | 100 | — | — | 1000 0 0 | 1000 |

This form can be cut out and sent with remittance for the amount of the deposit on the shares, either to Parr's Bank (Limited), Bartholomew Lane, London, E.C., or branches; or to Barclay and Co. (Limited), 54, Lombard Street, London, E.C., or branches.

## THE POWER-GAS CORPORATION (LIMITED).

Incorporated under the Companies Acts, 1862 to 1900.

Capital .. .. .. £350,000

divided into

250,000 Ordinary Shares of £1 each, and 100,000 Deferred shares of £1 each.

Issue of 183,538 ORDINARY SHARES of £1 each.

Payable—2s. 6d. on application; 2s. 6d. on allotment; and the balance as and when required, by calls not exceeding 5s., at intervals of not less than two months.

Form of Application for Ordinary Shares.

To the Directors of the Power-Gas Corporation (Ltd.),

Gentlemen—Having paid to your bankers the sum of £ , being a deposit of 2s. 6d. per share on application for Ordinary shares in the above Company, I hereby request you to allot me that number of shares; and I agree to accept such shares, or any less number that may be allotted to me, upon the terms of the prospectus, of the Company, dated July 18, 1901, and of the Memorandum and Articles of Association of the company, and I authorize you to place my name upon the register of shareholders in respect of any shares so allotted to me, and I agree to pay the further instalments payable in respect of the said shares as and when called upon so to do.

Name (in full) .....

(Mr., Mrs., or Miss).....

Address .....

Occupation, rank, or usual title.....

Ordinary signature .....

Date .....1901.

## FOR IMMEDIATE SALE—48 Lamp

COLUMNS, Wrought-Iron Scrolls, and 14-inch COPPER LANTERNS. One large LAMP COLUMN, with 300-Candle Power ARC LAMP; Two 100-Candle Power ARC LAMPS and BRACKETS; 20 LAMP BRACKETS (various), with 14-inch Copper Lanterns.

Apply to H. WIMHURST, Gas-Works, SLEAFORD.

## TO BE DISPOSED OF, at once, 170 feet,

and in February next a further 580 feet, of WROUGHT-IRON ⊐-shaped HYDRAULIC MAINS, with Cast-Iron Cover Plates and Crutches for carrying same complete. Also a large quantity of 20 in. by 16 in. ⊐ MOUTHPIECES for Luted Lids, straight and curved Ascension Pipes, Arch and Dip Pipes.

To be seen on application at the Gas-Works, SALTLEY, BIRMINGHAM.

### FENNY STRATFORD GASLIGHT AND COKE COMPANY, LIMITED.

## FOR SALE—Two 6 ft. and one 4 ft. 6 in.

length of HYDRAULIC MAIN ∪ shape. Size 13 in. by 11 in. Eight OVAL and Six ROUND MOUTHPIECES; Doors and Cramps complete. Also Eight lengths of 4-inch ASCENSION-PIPES. Second-hand, but in good condition.

Apply to the Secretary, THOMAS BEST, Fenny Stratford, BLETCHLEY.

### SCARBOROUGH GAS COMPANY.

16-INCH FLANGE GAS-VALVES.

## THE Directors have for Sale—

Seven 16-inch INTERNAL SCREW DOUBLE-FACED SLIDE-VALVES (C. & W. Walker).

Two 16-inch INTERNAL SCREW SLIDE-VALVES (C. & W. Walker).

These Valves are in good condition, and may be inspected on the Company's Works, Seamer Road, Scarborough.

Further Particulars on application.

ALFRED B. TOBEY,
Acting Engineer and Secretary.

Company's Office: 32, Westborough,
Scarborough, July 16, 1901.

### TENDERS FOR COAL AND CANNEL.

## THE Directors of the Sheffield United

Gaslight Company invite TENDERS for GAS COAL, NUTS, and CANNEL, for delivery during the period ending the 30th of June, 1902; the Tenders to state whether the coal is Screened or Unscreened.

Tenders (Forms for which can be obtained on application) must be delivered to the undersigned not later than the first post on Thursday, the 25th inst.

The Directors reserve the right to take the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.

HANBURY THOMAS,
General Manager and Secretary.

Commercial Street, Sheffield,
July 10, 1901.

## THE Directors of the Kingston-upon-

Thames Gas Company invite TENDERS for the supply of 15,000 Tons of best DURHAM or other good GAS COAL, to be delivered in Barges at the Free Wharf, Kingston-upon-Thames, deliveries as required at the rate of about 40 per cent. during the Six Summer Months, and 60 per cent. during the Six Winter Months, between the 1st of August, 1901, and the 31st of July, 1902.

Also 5000 Tons of BARROW or other good screened SILKSTONE GAS COAL, delivered in Trucks at the Company's Siding. Time of delivery and quantities as above stated.

Tenders to be sent in on or before the 24th inst., addressed to the Chairman of the Directors, and endorsed "Tender for Coal."

Any further Information may be obtained of the undersigned.

The Directors do not bind themselves to accept the lowest or any Tender.

H. F. PACKHAM,
Engineer and Manager.

Gas-Works, Kingston-upon-Thames,
July 12, 1901.

### BOROUGH OF TORQUAY.

ST. MARY CHURCH GAS-WORKS EXTENSIONS AND IMPROVEMENTS.

## THE Corporation of Torquay are pre-

pared to receive TENDERS for the execution of the under-mentioned WORKS, and for the supply and erection of the following PLANT, viz.:—

REMOVAL and REFIXING of STATION METER, WASHER, &c.
CHIMNEY.
RETORT-BENCH.
PIPE CONDENSERS.
EXHAUSTERS.
MECHANICAL WASHER-SCRUBBER.
PURIFIERS (elevated).

The whole of the Works to be carried out under the supervision and to the satisfaction of Mr. Francis Chalmers, Manager of the Gas-Works, who will supply any further Particulars required.

The Plans and Specifications may be seen, and copies of such Plans and Specifications, together with Form of Tender, obtained on application to the undersigned, on the deposit of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender upon the prescribed Form and within the stated time.

Should a Contractor withdraw his Tender, the amount of his Deposit will be forfeited.

Sealed Tenders, endorsed "Extensions and Improvements, St. Mary Church Gas-Works," must be delivered to the undersigned not later than noon on Tuesday, Aug. 6, 1901.

The Corporation do not bind themselves to accept the lowest or any Tender.

FREDK. S. HEX,
Town Clerk.

Town Hall, Torquay,
July 12, 1901.

## WANTED, a second-hand combined

ENGINE and EXHAUSTER, mounted on Base plate, to pass 5000 cubic feet of Gas per hour, complete with Disc Valves and Compensating Gas Governor. All to be in thorough condition.

Also a small EGG-ENDED or CORNISH BOILER, 4 or 5 Horse power, complete with all Accessories.

Full Particulars to Mr. ROBERT FISH, Assoc.M.Inst. C.E., Lessee, Gas-Works, EAST COWES, I. OF W.

### BODMIN GAS CONSUMERS' COMPANY, LIMITED.

## TENDERS are invited for One Thousand

Tons of best screened GAS COAL delivered into G.W.Rly. Trucks at Fowey or on the L. & S.W. Rly. Siding adjoining the Company's Works, Bodmin.

Contractors to state name of Colliery and enclose analysis.

Three hundred Tons to be delivered before Christmas; remainder before June 1, 1902.

JOHN PETHYBRIDGE,
Secretary.

Bodmin, July 19, 1901.

### COUNTY BOROUGH OF SALFORD.

(GAS DEPARTMENT.)

## THE Gas Committee invite Tenders for

the purchase of about 300 Tons of SPENT OXIDE.

Further Particulars and Form of Tender may be obtained from the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed Tenders, endorsed "Tender for Spent Oxide," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 25th of July, 1901.

(Signed) L. C. EVANS,
Town Clerk.

Town Hall, Salford,
July 16, 1901.

### TENDERS FOR GAS-MAINS.

## THE Directors of the Slough Gas and

Coke Company invite TENDERS for 650 yards of 4-inch and 700 yards of 3-inch CAST-IRON MAINS and for SPECIALS at per Ton. Also for LEAD and YARN.

Tenders must specify quality of Metal, weight, and testing of Pipes.

**The Directors do not bind themselves to accept the lowest or any Tender.**

Tenders, endorsed "Tender for Mains," to be delivered on or before Tuesday, the 30th inst.

By order,
ARTHUR THOMAS,
Secretary.

High Street, Slough,
July 15, 1901.

### COALVILLE URBAN DISTRICT COUNCIL.

## THE Gas Committee of the above

Council invite TENDERS for the supply of about 500 Tons of best screened GAS COAL, and 1500 Tons of best washed GAS NUTS, to be delivered at Whitwick, L.N.W., or Coalville, Midland Railway, as required, during the period from Aug. 1, 1901, to June 30, 1902.

Tenders, endorsed "Coal," to be sent to the Chairman of the Gas Committee at these Offices, not later than Tuesday, the 30th inst.

**The Committee do not bind themselves to accept the lowest or any Tender.**

THOMAS JESSON,
Clerk.

Council Offices, Coalville.

### EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

PATENT FUEL PLANT.

## THE Commissioners are prepared to re-

ceive TENDERS for the supply of a PLANT, including ENGINES, BOILERS, DISINTEGRATORS, BRIQUETTE MACHINE, &c., &c., complete for manufacturing BRIQUETTES from Coke Dust and General Refuse, at the rate of 5 Tons per hour guaranteed.

Further Information may be obtained on application to the Chief Engineer and Manager, Mr. W. R. Herring, Gas-Works, New Street, Edinburgh.

Tenders are to be delivered on or before the 27th curt., to the undersigned in envelopes, marked "Tender for Briquette Plant."

JAMES M'G. JACK,
Clerk.

5, Waterloo Place, Edinburgh,
July 15, 1901.

### URBAN DISTRICT COUNCIL OF WINSFORD.

## THE above Council are prepared to re-

ceive TENDERS for the supply of CANNEL and best screened GAS COAL, to be delivered at the Cheshire Lines Station, Winsford, or the Over and Wharton Station of the L. & N.W. Railway, or at the Council's Wharf on the River Weaver at Winsford.

The Material is required for a term of Twelve Months from the 1st day of October, 1901. The probable quantities required will be about 300 Tons of Cannel and about 1200 Tons of Gas Coal, which must be freshly wrought, well screened, and free from Sulphurous Pyrites, and other objectionable matter; but the Council reserve the right of reasonably increasing or decreasing the quantities named. The person whose Tender is accepted will be required to enter into an Agreement with the Council for the due performance of the Contract.

Sealed Tenders, stating price per ton, delivered as above, to be received by the undersigned on or before the 1st day of August, 1901, and endorsed "Gas Coal Tender."

**The Council do not bind themselves to accept the lowest or any Tender.**

Forms of Tender are not supplied.

Further Particulars may be had on application to the Gas Manager, F. Sidwell, Winsford, or from

JNO. H. COOKE,
Clerk to the Council.

Council Offices, Russell Street,
Winsford, Cheshire, July 17, 1901.

**Construction of the authorized Water and Gas Works at Goodwick, the terminus of the Great Western Railway Company's new Short Express Route to the South of Ireland.**

# The North Pembrokeshire Water & Gas Company,

**Incorporated by the Fishguard Water and Gas Act, 1899, and the North Pembrokeshire Water and Gas Act, 1900.**

## CAPITAL £40,000, in 40,000 Shares of £1 each.

**ISSUE AT PAR OF**

## 30,000 ORDINARY SHARES OF £1 EACH

**(The balance being reserved for future Issue at such Premium as may be decided on).**

**RANKING FOR DIVIDEND UP TO TEN PER CENT. PER ANNUM.**

**A Minimum Dividend of 4½ per cent. is guaranteed for two years, pending completion of the Company's works.**

**PAYMENTS—5s. per Share on Application; 5s. per Share on Allotment; and the Balance at intervals of Two Months.**

The Liability on the Shares is limited to £1 per Share. The Borrowing Powers are limited to £12,000.

**Bankers:** LLOYDS BANK, LIMITED, Fishguard, Pembrokeshire.

**The List WILL CLOSE on or before THURSDAY, the 25th of JULY, 1901.**

## ABRIDGED PROSPECTUS.

The Directors give notice that they are prepared *to receive applications at par for* 30,000 *Shares of* £1 *each, ranking for dividend up to* 10 *per cent.*; being part of the Company's authorized capital under Sec. 23 of the North Pembrokeshire Water and Gas Act, 1900.

The issue is made for the purpose of constructing the authorized water and gas works. The water-mains will shortly be laid in High Street, West Street, Main Street, Kensington Street, Tower Hill, Park Street, Hamilton Street, Wallis Street, Hottipas Street, Fishguard, Goodwick, and other places.

**The Company's water and gas area is an important one, including as it does that of Goodwick, Fishguard, Dinas, and Newport; the former being the terminus for the Great Western Railway Company's new short express route for passengers and goods traffic between the South and West of Ireland, by direct communication with the Great Southern and Western Railway Company of Ireland, and South Wales, the Southern, Western, and Midland Counties of England. This part of the Company's district is being rapidly developed; a considerable area in the vicinity of the harbour having already been acquired for that purpose.**

Goodwick Harbour is well sheltered by the land and high cliffs on each side of Fishguard Bay; and when the construction of the pier now in hand is completed, the harbour will be further protected. *The harbour, being in deep water, is easy of access at all times, and ships will enter direct from the Irish Channel—a saving of much time as compared with the estuary at New Milford.* The new Railway, opened on 14th July, 1899, places Goodwick now in direct communication with Paddington.

As an illustration, reference may be made to the great developments which have taken place at Holyhead since the London and North-Western Railway Company's route to Ireland was opened. From practically a village, Holyhead is now a thriving town.

In answer to a question before the Select Committee of the House of Commons, the Chairman of the Great Western Railway (Earl Cawdor) stated, in reference to the proposed route from Fishguard, "not only is the passage considerably shorter, but the possibilities of Fishguard are undoubtedly greater than the possibilities of New Milford." Earl Cawdor also stated that his Company contemplated an immediate expenditure of £260,000 at the Fishguard works to make them suitable for cross-channel traffic, and a future expenditure of from £500,000 to £600,000 to accommodate Atlantic liners.

**The Company have obtained, under their 1899 and 1900 Acts, powers to secure an excellent water supply by gravitation. The water is obtained from mountain streams draining a catchment area of nearly three miles in extent; and from careful gaugings and observations taken, it is calculated that the total discharge in 1899, under the catchment area in the Company's first Act, was 240,000,000 (two hundred and forty million) gallons, OR AN AVERAGE OF 657,534 GALLONS PER DAY, and under the catchment area in the second Act, 1,125,000,000 (one thousand one hundred and twenty-five million) gallons, or 3,082,191 GALLONS PER DAY.**

**The works which will be shortly constructed are authorized by the 1899 Act; and the water will flow from the intake chamber by means of a line of pipes to the Service Reservoir at Fishguard, at a level of about 400 feet above Ordnance Datum, whence the district will be supplied by gravitation.** The purity of the water is certified by Henry Kenwood, M.B., D.P.H., F.C.S., of University College, Gower Street, W.C., who reports as follows: "*The analytical results prove this to be a water of great purity. The figures furnish no evidence of animal pollution, either present or past. I am of opinion that the water may be safely used for drinking purposes.*"

**The Company's Gas-Works will be constructed on modern lines, with spare retort-house room for increasing the capacity. The plant throughout is designed to admit of easy extension. It is proposed to build a Manager's house in connection with the works, also a workshop, stores, &c. The site for the Gas-Works is situate near the coast; thus affording good facilities for carriage.**

The Company's business will include the supply of Cookers and Stoves on the "Slot" system, which has proved so successful with other companies. Arrangements are being made to hold a Gas-Cooking Exhibition for the Sale or Hire of Cookers and Stoves.

Under a contract which has been entered into, the Water-Works are to be completed and handed over within 18 months from the 24th of June, 1901, and the Gas-Works and laying of Gas-Mains within two years. Pending the completion of these Works, interest is guaranteed.

The Company's Shares, **ranking, as they do, for dividend up to 10 per cent.**, and authorized by Special Acts of Parliament, offer an unusually sound water and gas investment, especially as no Preference Shares can be created, and the Debenture capital is limited to less than one-third of the Share capital. Attention is also called to the developments in the Company's area of supply, the economical mode of water supply by gravitation, and the smallness of the Company's capital, all of which are unusually favourable to the payment of dividends at an early date.

Prospectuses and Forms of Application may be obtained at the Company's offices, Fishguard, Pembrokeshire; or of their Bankers, Lloyds Bank, Limited, Fishguard, Pembrokeshire; the Head Office, Lombard Street, London, E.C., and other branches.

**Directors.**

C. H. BINNEY, Director of the St. David's Water and Gas Company (Pem.) (Chairman).
R. BARNES, Chairman of the Wetherby District Water Company.
W. B. MARTIN, Director of St. David's Water and Gas Company (Pem)
E. T. GOULD, Director of North Warwickshire Water Company.
F. MILLER, Director of the Crowborough Gas Company.

**Solicitor.**

W. T. S. TOMBS, Fishguard.

**Bankers.**

LLOYDS BANK, LIMITED, Fishguard.

**Engineers.**

Messrs. WALTON (M.Inst.C.E.) & PORTSMOUTH (Assoc.M.Inst.C.E.), 6, Great College Street, Westminster.
G. H. PERRYN (Assoc.M.Inst.C.E.), 21, Victoria Street, S.W.

**Auditors.**

W. B. KEEN & CO., 1, Church Court, Old Jewry, E.C.

**Offices.**

FISHGUARD, PEMBROKESHIRE.

**Analyst.**

HENRY KENWOOD, M.B., D.P.H., F.C.S.

**Secretary.**

L. H. DEROUET.

17*th July*, 1901.

### BENZOL WANTED.

**THE Holywood Gas Company, Limited,** County Down, invite TENDERS for 500 to 1000 Gallons purified 90 per cent. BENZOL, delivered at their Works in such quantities as may be required between the months of September, 1901, and March, 1902, in perfectly tight Drums containing 40 to 80 gallons each.

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**THE Corporation of Middleton are prepared** to receive TENDERS for the supply of COAL and CANNEL to their Gas-Works.

Full Particulars as to Quantities, &c., and Form of Tender may be obtained from Mr. T. Duxbury, Gas Engineer.

Tenders, addressed to the Chairman of the Gas, &c., Committee, to be delivered at my Office on or before Wednesday, Aug. 7, 1901.

The Corporation do not bind themselves to accept the lowest or any Tender.

FREDERICK ENTWISTLE,
Town Clerk.

Town Hall, Middleton,
near Manchester, July 20, 1901.

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### RADCLIFFE AND PILKINGTON GAS COMPANY.

SPENT OXIDE.

**THE Directors of this Company invite** TENDERS for the purchase of about 160 Tons (more or less) of SPENT OXIDE.

Samples for testing may be taken from the heap by any intending Purchaser, or will be sent, together with Particulars, on application to the undersigned.

Tenders will be received until Wednesday, the 31st inst.

JAMES BRADDOCK,
Manager and Secretary.

Gas-Works, Radcliffe,
July 15, 1901.

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### URBAN DISTRICT COUNCIL OF ABERTILLERY (MON.).

**THE Gas Committee invite Tenders for** their surplus TAR for the Year ending Aug. 31, 1902.

The Tar will be delivered in Barrels on Rails at this Station.

Tenders, endorsed "Tar," to be addressed to the Clerk, and delivered not later than Twelve o'clock noon, on the 17th of August next.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
J. M'BEAN,
Manager.

Gas Offices, Abertillery,
July 20, 1901.

---

### CLACTON URBAN DISTRICT COUNCIL.

**THE above Council invite Tenders for** the supply and delivery of 2200 Tons of best screened GAS COAL at Clacton-on-Sea, in quantities as may be required during the ensuing Twelve Months.

Particulars and Form of Tender may be obtained upon application to the Engineer and Manager, Mr. Sidney Francis, Town Hall, Clacton-on-Sea.

Tenders, sealed and endorsed "Tender for Coal," to be delivered to the undersigned not later than Four o'clock p.m. on Monday, the 12th of August next.

The Council do not bind themselves to accept the lowest or any Tender.

GEO. T. LEWIS,
Clerk to the Council.

Town Hall Buildings,
Clacton-on-Sea, July 18, 1901.

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### TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

**THIS Council invite Tenders for the** supply and erection at the Gas-Works, Tyldesley, of one STEEL TANK for GASHOLDER.

Further Particulars as to same may be had on application to the Engineer, Gas-Works, Tyldesley.

Tenders (on authorized forms only, which will be supplied by the Gas Engineer on application), sealed, and endorsed "Tender for Steel Tank," to be addressed to the undersigned, and delivered at the Council Offices, Tyldesley, not later than the 12th of August next.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
WM. J. MATTHEWS,
Clerk.

Council Offices, Tyldesley,
July 10, 1901.

---

### RHONDDA URBAN DISTRICT COUNCIL.

(GAS AND WATER DEPARTMENT.)

**THIS Council are prepared to receive** TENDERS for the following:—

CONTRACT No. 14.—The Erection of a COTTAGE, STORES, WORKSHOP, GOVERNOR and EXHAUSTER HOUSE at Tonypandy.

CONTRACT No. 15.—18-inch GAS STATION GOVERNOR and CONNECTIONS.

CONTRACT No. 16.—GAS-ENGINE and EXHAUSTER to pass 30,000 cubic feet per hour.

Drawings and Specifications may be seen, and Forms of Tender obtained, upon application to Mr. Octavius Thomas, Engineer and Manager, Gas and Water Offices, Pentre R.S.O., Glam.

The Contractors will be required to pay the Standard Rate of Wages recognized in the District.

Tenders, endorsed "Contract No. 14, 15 &c.," as the case may be, addressed to the Chairman of the Gas and Water Committee, to be sent to the undersigned on or before Ten a.m., Thursday, the 25th inst.

The Council do not bind themselves to accept the lowest or any Tender.

WALTER H. MORGAN,
Clerk.

Council Offices, Pentre R.S.O., Glam.,
July 13, 1901.

---

### URBAN DISTRICT COUNCIL OF PADIHAM.

**THE Gas Committee invite Tenders for** the supply of screened ARLEY GAS COAL for the Year ending July 31, 1902.

Specification and Form of Tender from Mr. Smith, Gas-Works, Inskip Street, Padiham.

Endorsed Tenders to the undersigned, not later than Saturday, July 27, 1901.

J. R. SMITH,
Clerk to the Council.

Padiham, July 15, 1901.

---

### THE GASLIGHT AND COKE COMPANY.

**NOTICE is Hereby Given, that a** HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors in this Company will be held at this Office on Friday, the 2nd day of August next, at Twelve o'clock (noon) precisely, to transact the usual Business, including the declaration of a Dividend for the Half Year ending on the 30th day of June last.

By order,
JOHN WILLIAM FIELD,
Secretary and General Manager.

Chief Office: Horseferry Road,
Westminster, S.W., July 16, 1901.

---

### SOUTH METROPOLITAN GAS COMPANY.

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Cannon Street Hotel, in the City of London, on Wednesday, the 14th day of August next, at Two o'clock in the afternoon precisely, to receive the Directors' Report and the Accounts of the Company for the Half Year ended the 30th of June last, to declare a Dividend for the same period, and to consider a recommendation of the Directors to increase the remuneration of the Secretary.

Notice is Hereby also Given, that immediately after the conclusion of the business of the Ordinary Meeting, an EXTRAORDINARY or SPECIAL GENERAL MEETING will be held for the consideration of a scheme enabling the Employees holding Ordinary Stock of the Company to elect Directors, pursuant to the provisions of the South Metropolitan Gas Acts, 1896 and 1897.

The TRANSFER BOOKS WILL BE CLOSED from the 31st day of July until after the Meeting.

By order,
FRANK BUSH,
Secretary.

Offices: 709A, Old Kent Road, S.E.,
July 20, 1901.

---

### LEATHERHEAD GAS AND LIGHTING COMPANY.

**NOTICE is Hereby Given of Sale by** TENDER of 200 SHARES of £10 each, being a portion of the Additional Share Capital authorized to be raised in pursuance of the powers of the Leatherhead Gas Act, 1901.

No Tender will be received after Eleven a.m. on Wednesday, the 14th day of August, 1901.

Forms of Tender can be obtained on application to the Secretary.

By order,
JOHN YOUNG,
Secretary.

Leatherhead, July 18, 1901.

---

### SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

**MR. ALFRED RICHARDS begs to** notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

---

By order of the Directors of the

### SOUTHEND GAS COMPANY.

£5000 NEW ORDINARY STOCK
AND
£5500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

**MR. ALFRED RICHARDS will Sell the** ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, July 30, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

---

By order of the Executors of J. W. Fox, Esq., deceased, and other Owners.

### GAS AND WATER STOCKS AND SHARES

IN THE

CRAYS GAS COMPANY,
BROMLEY GAS CONSUMERS' COMPANY,
SOUTH-WEST SUBURBAN WATER COMPANY.

**MR. ALFRED RICHARDS will Sell the** ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, July 30, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

---

## ROBERT MARSHALL,

### CANNEL COAL MERCHANT,

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*Prices and Analysis of all the Scotch Cannels on Application.*

---

### BROMLEY GAS CONSUMERS' COMPANY.

**NOTICE is Hereby Given, that the** ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 8th day of August, at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance-Sheet certified by the Auditor to declare a Dividend, and for General Purposes.

The TRANSFER BOOKS WILL BE CLOSED from the 23rd of July to the 8th of August, 1901, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: 156, High Street,
Bromley, Kent, July 22, 1901.

---

### YEADON AND GUISELEY GASLIGHT AND COKE COMPANY.

ISSUE OF £2000 ORDINARY NEW "B" STOCK.

**THE Directors invite Tenders for the** whole or any part of £2000 ORDINARY NEW "B" STOCK of the said Yeadon and Guiseley Gaslight and Coke Company, being a portion of the additional Capital of £30,000 authorized to be raised by the Yeadon and Guiseley Gas Act, 1880.

The Sliding-Scale has been applied to the Capital of the said Company by the Yeadon and Guiseley Gas Act, 1899, and under such Act the above-mentioned Stock will be entitled to a Standard Dividend of 7 per cent., provided the Standard Price fixed by the said Act of 3s. per 1000 cubic feet is charged for Gas by the Company. The said Act contains provisions for the increase or decrease of the said Standard Rate of Dividend in the event of the price charged for Gas by the Company being below or above the said Standard Price.

Prior to the application of the Sliding-Scale by the said Yeadon and Guiseley Gas Act, 1899, the Company were authorized to pay Maximum Dividends of 10 per cent. on the "A" Stock and 7 per cent. on the "B" Stock, and to charge a maximum price of 5s. per 1000 cubic feet for Gas. The Company for many years past paid the Maximum Rates of Dividends, and during several Years charged the net Price of 2s. 8½d. per 1000 cubic feet for Gas. Owing to the great rise in the price of Coal last Year, the Company charged a net price of 3s. per 1000 cubic feet for Gas; but they hope to be able shortly to reduce the Price again.

The Directors invite Tenders for the whole of the said Stock or for any portion thereof not less than £10 or any multiple of £10, subject to the Provisions of the Yeadon and Guiseley Gas Acts, 1868 to 1899, and to the Conditions of Sale.

Tenders must be sent in on or before Wednesday, the 31st day of July, 1901.

Forms of Tender, with Particulars and Conditions of Sale, may be obtained on application to the Secretary of the Company at the Gas-Works, Yeadon, near Leeds, or to

WATSON, SON, AND SMITH,
Solicitors for the Company.

11, Cheapside, Bradford.

---

*Net Price: Cloth Bound, 12s. 6d.; Morocco Gilt, 18s.*

## GAS COMPANIES'

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### A Practical Treatise on the Keeping of Gas Companies' Accounts.

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Unlike most of the recent works on book-keeping, this volume is a valuable addition to the literature of the subject. Of text-books on book-keeping in general we have more than sufficient; but we heartily welcome the appearance of such books as this which deal exhaustively with the accounts of some particular industry. The authors deal with the subject in an exceedingly practical way, giving not only specimens of the books and forms required, but also a model set of transactions which should enable the student to obtain a thorough insight into the subject. — *The Accountant's Magazine.*

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

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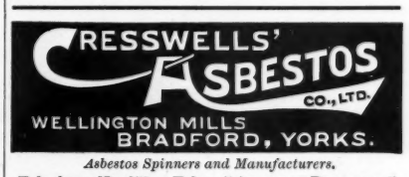


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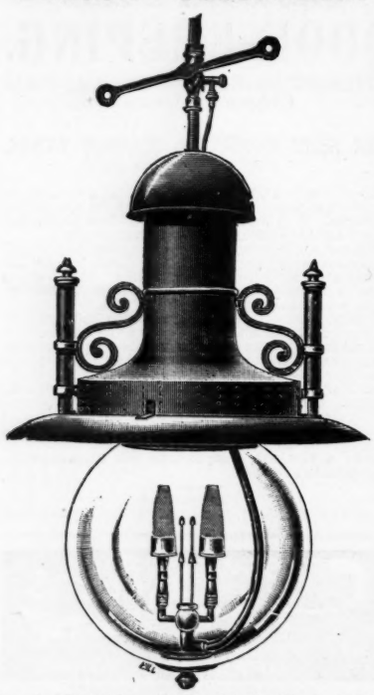
**"BEACON" GLOBE LAMP.**



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Illuminating Power . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

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Illuminating Power . . . . 17·8 candles.
Coke . . . . . 70 per cent.

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Yield of Gas per ton . . . . 10,500 cub. ft.
Illuminating Power . . . . 16·3 candles.
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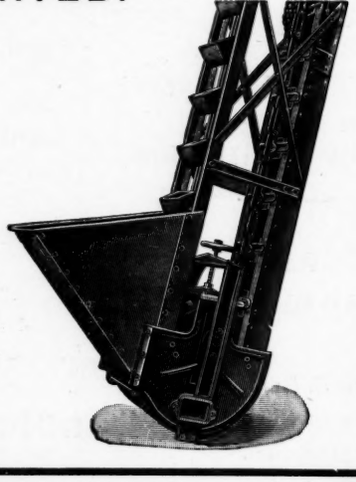

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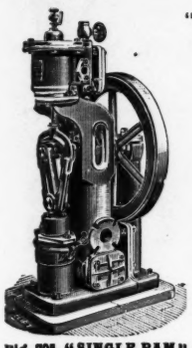

Fig. 705. "SINGLE RAM" STEAM-PUMP.

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

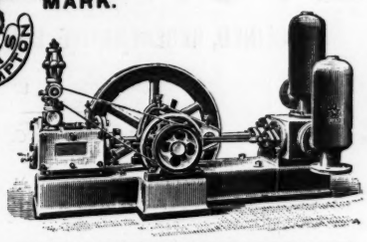

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

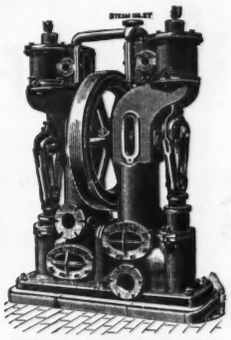

Fig. 713. "DOUBLE-RAM" STEAM-PUMP.

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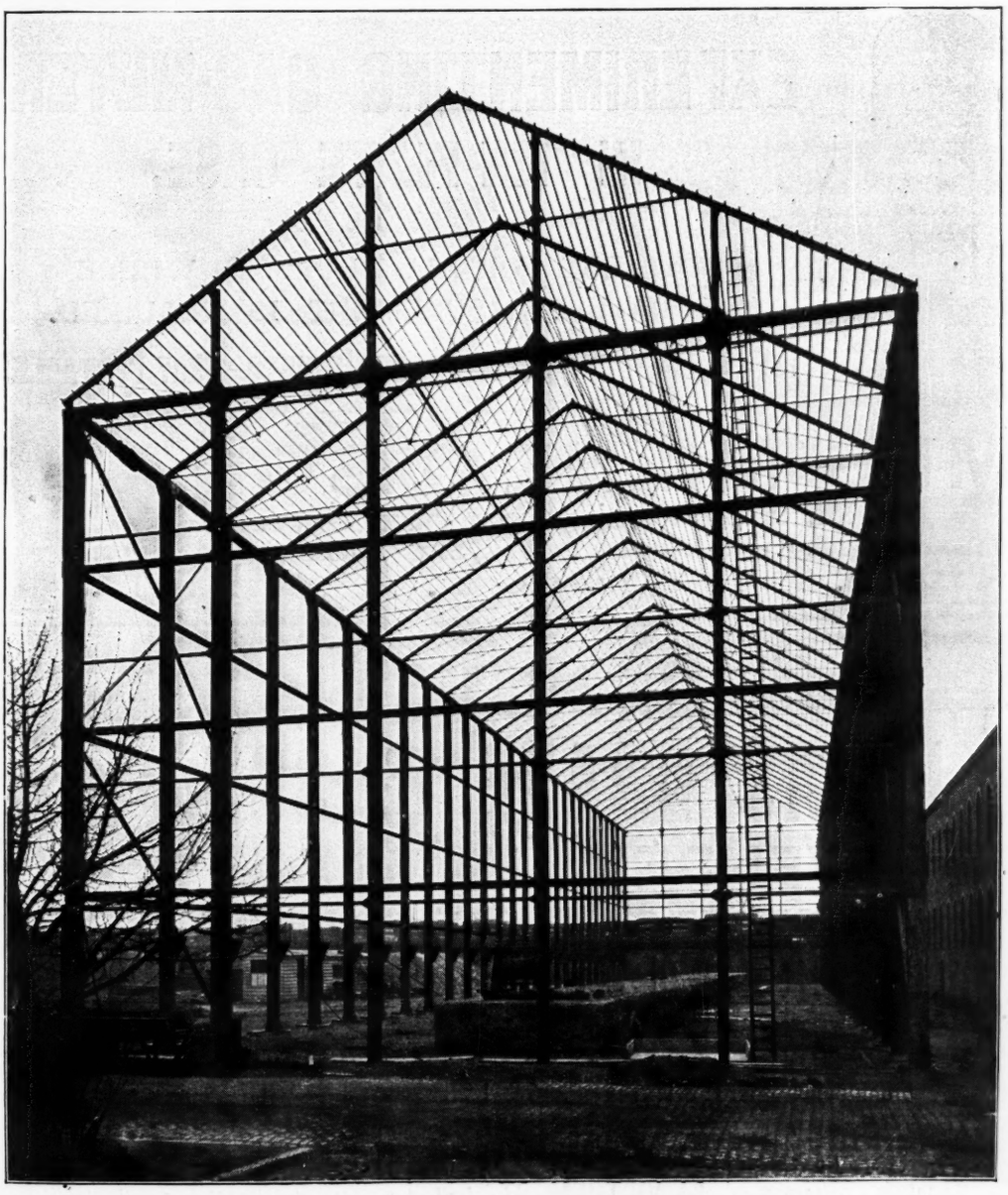

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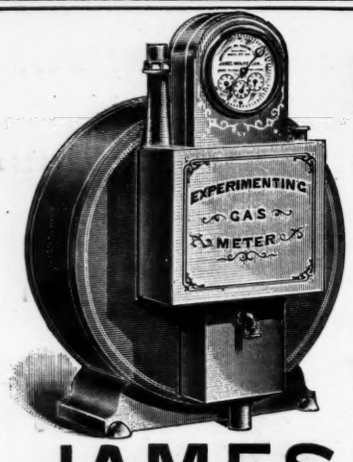


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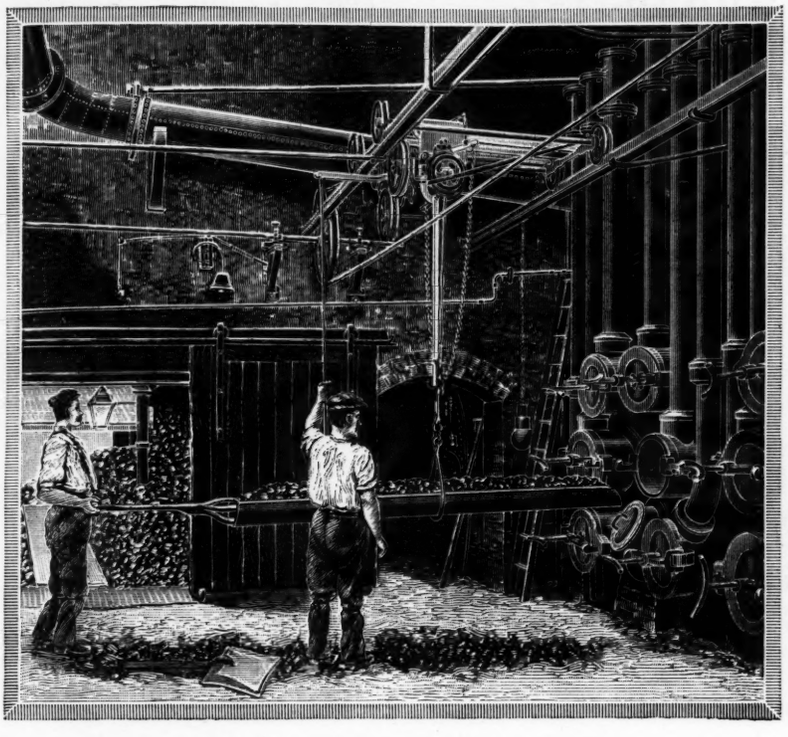

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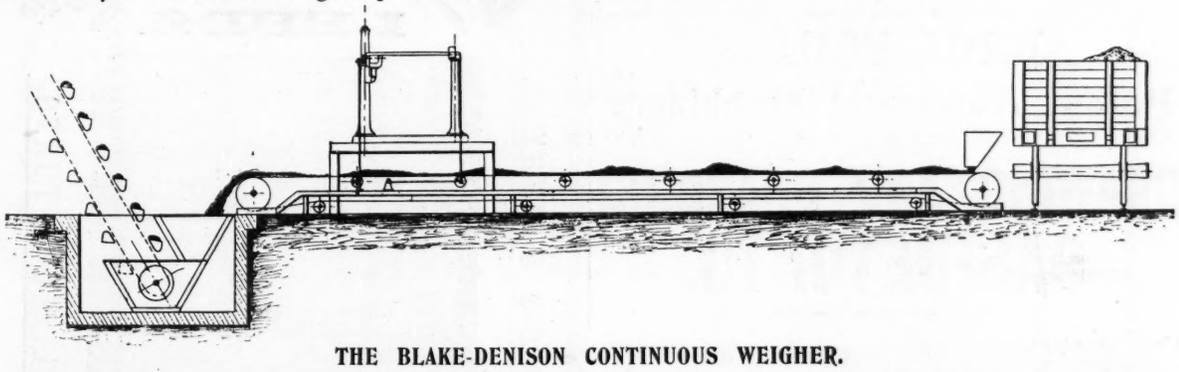

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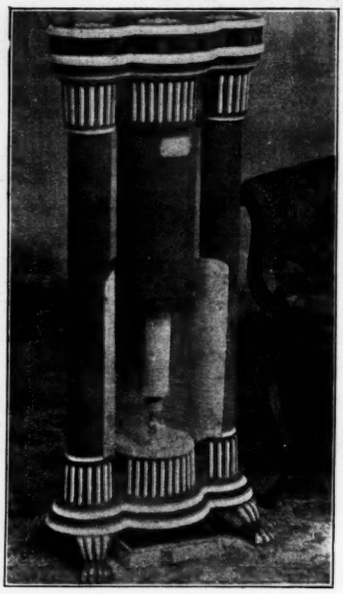

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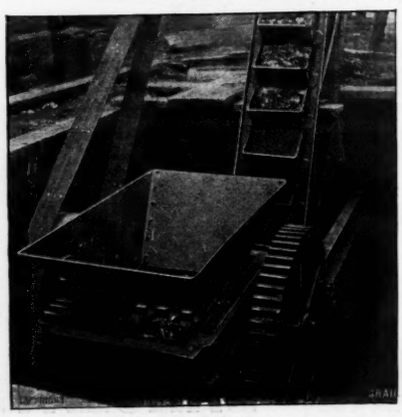

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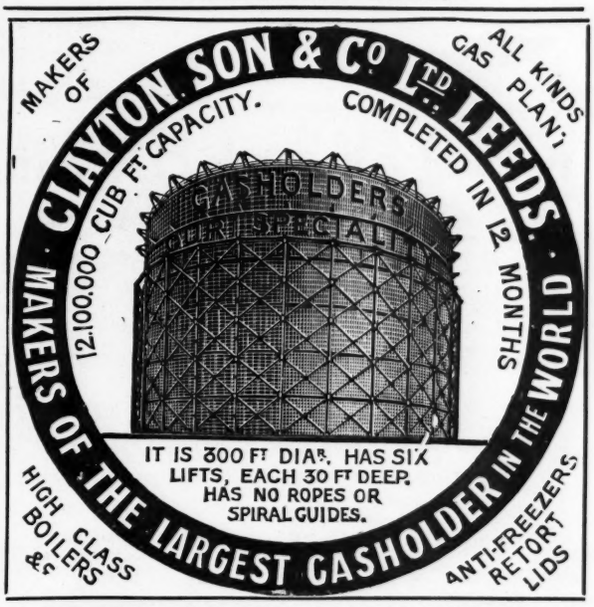
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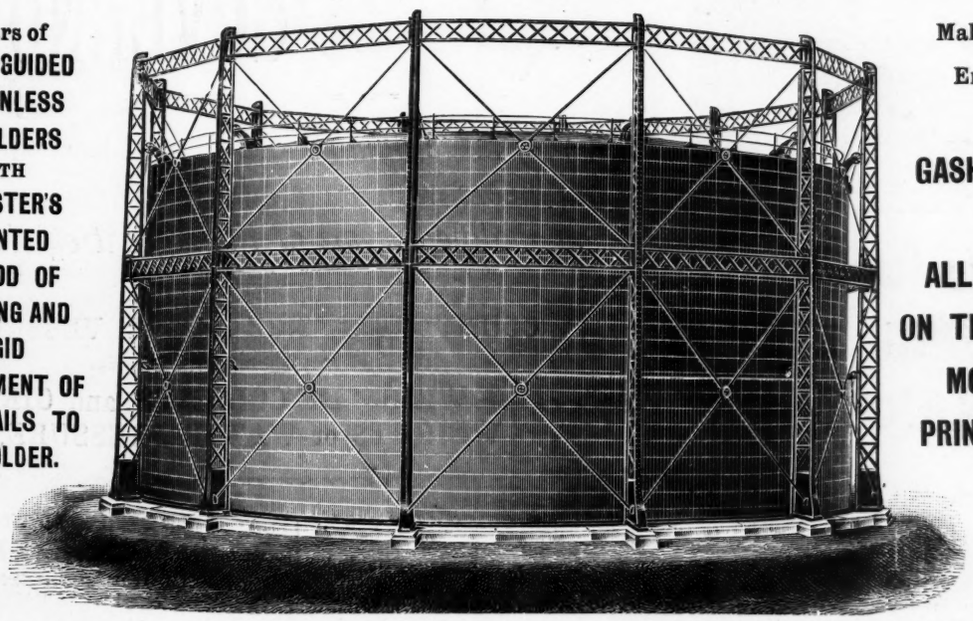

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[See also Advt. p. 194.


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